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1922

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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE
MEDICAL AND SURGICAL SCIENCES

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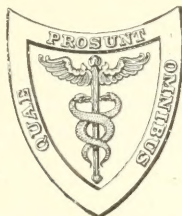
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VOLUME III. SEPTEMBER, 1922

OBSTETRICS—DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART,
LUNGS AND BLOODVESSELS—DISEASES OF THE BRONCHI, PLEURA
AND LUNGS—DERMATOLOGY AND SYPHILIS—DISEASES OF
THE NERVOUS SYSTEM



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PROGRESSIVE MEDICINE.

SEPTEMBER, 1922.

OBSTETRICS.

BY EDWARD P. DAVIS.

PREGNANCY.

The Duration of Pregnancy. In the *Zentralblatt für Gynäkologie*, 1921, No. 28, Siegel gives his results with the study of this problem. His material consisted of 125 cases in which the circumstances were such, that the last day of the last menstrual period could be known and also the probable time of conception. His effort was to determine the duration of pregnancy by comparing these two intervals, and also by observing the sex of the child. In addition to his own cases, he examined the literature on the subject, and in all draws his conclusions from practically 1000 cases in different groups. In studying this subject, he utilized the circumstances of the late war, which makes his conclusions more exact.

He finds that the average duration of pregnancy is 271.1 days after conception, and 281.75 days after the last menstruation. When the children are males, the average duration of pregnancy after conception was 271.3 days, and when the children were females 268.6 days. After menstruation, with male children the average duration of pregnancy was 281.2 days and female children 281.3 days. It is thus seen that with male children, pregnancy is 2 or $\frac{2}{3}$ days longer than with female children. It has long been observed that there is a difference in the weight and length of male and female children of from $\frac{1}{4}$ to $\frac{1}{5}$, and in the case of male children $\frac{3}{4}$ to $\frac{4}{5}$ and this can be accounted for by the longer pregnancy and the more rapid growth. All of these studies point out the fact that pregnancy is longer with boys than with girls. By taking into consideration all the circumstances, it was found that in 2 per cent of all pregnancies the average duration of pregnancy is exceeded, and that this may be from 320 days after conception to 330 days after menstruation. During the war the duration of pregnancy was lengthened from 2 to 4 days. In 4 per cent of the cases which he observed, it was prolonged to 289 days after menstruation.

In the *Lancet*, August 13, 1921, page 357, occurs an editorial article reporting a recent interesting decision of the English courts. A divorce was sought because, in the given case, a child had been born 331 days

after the only possibility of legitimate conception. The child weighed eleven pounds. The Attorney General asked the medical experts summoned, whether they could state any scientific reason why pregnancy could not last 331 days. The longest previous record was 315 days, which was 336 from the last menstrual period. In this case the child weighed about sixteen pounds. In the case under consideration, the patient had not been examined at repeated intervals and no accurate record had been kept of the size of the uterus at different times. It was interesting to know that, according to French law the limit to legitimate pregnancy is placed at 300 days, and this is also the Rhenish Civil Code. The common law of Prussia recognizes 302 days. This decision establishes in England the period of legitimate pregnancy at 331 days.

The Blood Group in the Mother and Child. In the *British Medical Journal*, April 30, 1921, page 641, Chavasse reported a series of experiments on the blood of infants and their mothers. He finds that the four blood groups usually found in adults are also present in infants. The rapid macroscopical test for the blood group was quite as efficient as some complicated methods and may be considered accurate for adults and infants. The blood groups of mother and child frequently differ, and when twins were present, there was often a difference between them, and between them and the mother. A condition, which he terms "maternal threat," might develop when there is a difference between the blood group of infants and mother, but under these circumstances the child's blood was invariably agglutinated by the serum of its own mother. In about 30 per cent of cases, the agglutinins which belong to the group were fully developed at birth, and this would constitute a fetal threat to the mother. There was no obvious relationship between maternal threat and sterility, or between fetal threat and eclampsia and the toxemias of pregnancy. No immunity was evidently acquired and the protective mechanism present was produced by the dialysis of agglutinins through the placenta which was not permitted by the intervening cells during life.

In lying-in women the blood group was the same as that of normal adults, nor was there any difference in the blood group of mother and child on one hand, and the sex of the child on the other. In cases of melena neonatorum, maternal blood should not be transfused, unless it has previously been demonstrated that both mother and child belong to the same blood group. In one-third of all cases they differ, and then another donor should be selected.

Pregnancy and the Thyroid Glands. Albeck¹ interrogated 1707 pregnant women, of whom 1157, or 67.78 per cent, had suffered from severe vomiting. Of 358 who were able to furnish particulars of the interval which had elapsed between the commencement of the vomiting and the last menstrual period, the interval was eight days in 0.28 per cent, fourteen days in 12.8 per cent, three or four weeks in 36 per cent, six weeks in 10 per cent, eight weeks in 12.3 per cent, twelve to sixteen weeks

¹ Gynéc. et Obstét., 1921, vol. 2.

in 9.2 per cent, and sixteen to twenty weeks in 0.5 per cent. Albeck believes that simple vomiting, intractable vomiting, and vomiting with jaundice and polyneuritis are all conditions of pregnancy toxemia provoked by noxious substances proceeding from the embryo. He has found, from examination of the thyroid gland twenty-four hours after delivery in 1581 women, that there is a constant relationship between the size and consistency of the thyroid gland and the intensity of the vomiting, women with a large, soft thyroid rarely vomit during pregnancy; those with a small, hard thyroid always vomit. Albeck compared also the histological appearances of the thyroid glands in gravid and non-gravid sows, the latter of which did not show any naked-eye enlargement of the gland. In the gravid sows, minute examination showed constantly hyperplasia, with mitotic and amitotic nuclear divisions.

Pregnancy Following Implantation of Outer End of Fallopian Tube. Shaw¹ reports a case where a woman had been operated upon for a cornual pregnancy. The left cornu was dissected out and found to contain an interstitial pregnancy. The Fallopian tube was drawn into the cornu so that its inner end lay in the uterine cavity. The wound was closed and the excess of bladder peritoneum was drawn over the raw area to prevent adhesions. The fimbriated end of the tube remained free after the operation about 1 cm. long. A small drain was placed in the lower end of the abdominal incision; this patient subsequently became pregnant and at seven months gave birth to a still-born child. There was a marginal placenta previa with a breech presentation.

Tuberculosis and Pregnancy. Pottenger² reviews our present knowledge upon this subject.

He states briefly what is known concerning the physiological condition in the body before impregnation and the influence of pregnancy upon these conditions. Pregnancy causes increased activity in the thyroid and also changes in the anterior portion of the pituitary body. This brings about a physiological readjustment, which is accomplished easily or with difficulty, in accordance with the normal condition of the individual.

For health and normal function, there must be a nerve and endocrine balance with the functions of the body, and, under these conditions, resistance to disease becomes possible.

When pregnancy occurs in healthy women, there must be an improvement in nutrition after the early weeks. There is also increased resistance to acute infections, and in a healthy individual the patient is protected and prepared for the forming of the child and its production and care.

It is thought that sudden cessation of menstruation, the withdrawal of the normal internal secretion which accompanies ovulation, and the injection of new secretions from the ova produce a disturbance in the body of the mother. The thyroid and pituitary are stimulated. The forces of nutrition are increased; calcium is stored in the body, and

¹ Johns Hopkins Hospital Bulletin, September, 1921.

² Surgery, Gynecology and Obstetrics, November, 1921, p. 353.

when adjustment has become complete the normal woman enters upon a period of comparative good health. When, however, a woman is tuberculous, these adjustments may not be normally performed and ill-health will result.

In studying this subject, we must take into account: (1) The frequency of tuberculosis of the genital organs; (2) the effect of tuberculosis upon pregnancy; (3) the effect of tuberculosis in a pregnant woman upon the unborn child and after its birth; (4) the effect of pregnancy upon the tuberculous process.

Statistics indicate that, among tuberculous women, the genital organs are involved in 1.5 per cent, and among women who are not tuberculous in 1.36 per cent, from this it would appear that the tuberculous process does not affect the genital organs much more frequently with tuberculous, than those who are not tuberculous.

Tuberculosis has considerable effect in producing abortion and miscarriage, and in a considerable number of cases studied, it is found that 38.5 per cent of tuberculous women had abortion or premature labor; apparently, 8.9 per cent of those not tuberculous; the more advanced the tuberculosis, the greater the tendency to abortion or miscarriage. It is stated that when the pregnant woman has a mild tuberculosis, abortion will occur in 15 per cent, and when her disease is advanced, in 33 per cent.

What is the effect of tuberculous infection in the mother upon the child? So far as development of the child in the uterus is concerned, the frequency of abortion and miscarriage indicate that the child has not the same vitality as when the mother is not tuberculous. A greater number of infants are still-born, and a greater number die during the first year of life when the mother is tuberculous. This mortality is highest when the mother has tuberculous laryngitis, and this death rate may reach 60 per cent. Evidently, the care which the mother may receive during her pregnancy must have a great influence on the unborn child.

The percentage of still-born children from tuberculous mothers varies from 6 to 17.5, which is 2 to 5 times the ordinary mortality.

The children of tuberculous mothers are not necessarily tuberculous, and the child of such a mother may be as strong as any other. The extent and activity of the tuberculous process in the mother seem to determine the strength of the child. When, however, the mother has active tuberculosis, the danger that the child will become infected after birth is very great. This danger of tuberculous infection after birth varies from 3 per cent to 57.89 per cent; the highest figure is found in families where both parents were tuberculous and the child was brought up in the presence of the active disease. In children born of parents who were not tuberculous, there is a risk of accidental infection of about 3 per cent.

The question as to the influence of pregnancy on tuberculosis is not satisfactorily decided. It was formerly believed that pregnancy checked the progress of tuberculosis. This opinion is not held at present. Those who study tuberculous patients find that many women date the acute

stage of their disease to the occurrence of pregnancy, this percentage varies from 50 to 39. The mortality of pregnant women having tuberculous laryngitis may reach as high as 90 per cent. If a considerable number of statistics are analyzed, it is found that pregnancy increases the virulence of tuberculous infection in from 34 to 100 per cent of cases; 60 per cent increase in virulence may be taken as a fair estimate. When mortality is considered, a conservative estimate would be 10 per cent of tuberculous patients whose death could be traced to the occurrence of pregnancy. In these statistics, differences in mortality and morbidity rates must be explained by the different conditions in which the individual patients live.

In many cases, pregnancy complicated by tuberculosis is treated by interrupting the pregnancy. While this may be efficient in some cases, it fails in others, and for this reason some advocate sterilization. The high death rate is due largely to the deaths of patients who are suffering from active tuberculosis when pregnancy begins. In quiescent cases and among those properly treated, the death rate should not be so high; even under the best circumstances, however, pregnancy enormously increases the mortality of tuberculosis.

Unfortunately, the interruption of pregnancy does not always check the tuberculous process. It does, however, offer the patient the best chance to overcome her disease. This is true in the early months of pregnancy. In the later months some benefit, if only temporary, will result from interrupting the pregnancy. The best results would be obtained if all pregnant women having tuberculosis could have the pregnancy interrupted and then receive appropriate treatment for the tuberculous condition. Statistics show that early tuberculosis goes on favorably after the interruption of pregnancy in 87.9 per cent of the cases and that 3 of the moderately advanced cases are benefited, and also 29.4 per cent of those far advanced. The most favorable time for interference is in the first few months, especially in the first two months. The interruption of pregnancy between five and seven months is less favorable, and premature labor is least favorable of all. The question of interruption depends largely on what care the patient can receive in resisting the tubercular disease. While she may be very anxious for a child and willing to take the risk, she may be carried through a pregnancy and labor with little apparent danger, but unquestionably the tuberculous process will become more active and life will ultimately be shortened. It is thought that if the tuberculosis is quiet for two or three years, a patient might then risk pregnancy with little danger. Tuberculous women should not, however, have repeated pregnancy and should not nurse children.

The Circulation in Pregnancy. Wenckebach¹ considers the effect of pregnancy upon the circulation. It is thought that certain elements in the patient's blood are more potent during pregnancy than are the mechanical disarrangements caused by pregnancy. In the early months the uterus is too small to influence the circulation by pressure, and hence

¹ Zentralblatt für Gynäkologie, 1920, No. 38.

the changes which occur in the circulation must be due to the condition of the patient's blood. It is by some asserted that the quantity of blood is actually increased, and this is denied by others.

Obstetricians think mitral stenosis is the most dangerous diseased condition of the heart complicating pregnancy. While heart disease is not uncommon among pregnant women, death from this cause is comparatively infrequent. Among 60,000 patients there occurred but 11 such deaths, and of these 7 had suffered from heart disease for some time before confinement. In 3 cases autopsy shows recurrent endocarditis.

During pregnancy it is of the utmost importance that these patients receive careful attention. The condition of the blood and of the excretions should be studied, and necessary care given in accordance with the conditions present. Abundant rest is indicated, alternating with reasonable exercise. An index of the condition can be found in the presence or absence of congestion at the bases of the lungs, high or low blood-pressure and rapidly increasing edema. In diagnosis, too much importance must not be given to murmurs or to a rapid radial pulse.

Prolapse of the Uterus and Vagina Complicating Pregnancy and Labor.

Hannak¹ reports 5 cases of pregnant patients who, during pregnancy, had suffered from prolapse of the genital organs. These came into labor and were delivered in various ways, with varying results. It was noticed that in these patients the genital tract seemed to be in an infected and considerably inflamed condition. Among the 5 cases there were 4 deaths, from septic infection and peritonitis. While this is an unusual number of deaths, the literature shows in one instance 5 deaths in 53 cases, with the loss of 9 children. In another series of 91 cases, 4 of the mothers died of septic infection, 1 from ruptured uterus and 6 had puerperal fever. The mortality among the children was 28.5 per cent. Recent publications give a more encouraging view; in one series of 12 patients, 1 death from sepsis, 4 patients who had fever during the puerperal period, 3 fetal deaths and 9 living children. In 6 of the cases, labor was terminated by some obstetric operation.

It is not difficult to understand high mortality and morbidity. The altered position of the genital organs changes their condition from one of health to one of disease. The epithelial covering is altered and often injured, and ulcers are frequently present. Labor is prolonged in these cases, sometimes lasting seven days. The stage of dilatation is greatly lengthened; the cervix is not shortened, but remains elongated and prolapsed. The cervix is not softened nor dilated, and frequently must be incised to permit labor to occur. The membranes often rupture prematurely, which is always a complication. From what has been stated, it can readily be seen that prolapse of the genital tract during pregnancy is a serious complication, pointing inevitably to a great increase in danger for mother and child.

The Significance of Hydramnios for Fetal Life. Krahula² reports the results of his observations in the clinic in Bonn. He has observed all cases of polyhydramnios in the clinic for a considerable number of

¹ Monatschrift für Geburtshilfe und Gynäkologie, 1921, vol. 55.

² Ibid., 55, 199.

years and gives the results for 47 clearly definite cases. In some of these, it was possible to prolong the pregnancy by puncturing the membranes through the vagina and removing some of the excessive liquid. It was found that the great distention shortened the uterine muscle, making it much more susceptible to rupture; before little could be done to improve the prognosis for the children, even though the pregnancy was prolonged. While very few mothers died because of this complication, the lives of many children were lost.

Part of this fetal mortality arose from the fact that malformations in the fetus were very common in these cases, thus, 8 per cent is given as the frequency of fetal deformity, and this produces a mortality of 37.5 per cent. It is estimated that 25 per cent of all children born in polyhydramnios are lost, while after labor the mortality of 54.13 per cent is reported, but 13.81 per cent of these children survived their birth; while in some series 3.78 per cent of the children are revived, but 10.3 per cent surviving children were normal. While twins are often present with this complication, this does not greatly influence the prognosis. Deformities are less frequent when twins are present, but survival of the children is no better in twins than in other pregnancies. If the amniotic liquid increases rapidly during the pregnancy, there is no reason for expecting the birth of a living child. It has been proposed to puncture the uterus through the abdominal wall, but experience has shown that this is dangerous and useless, and whatever can be accomplished in treatment can best be done by puncturing the membranes through the vagina.

Edema Complicating Pregnancy. This not infrequent complication of pregnancy is described by Hinselmann.¹ He describes the case of a primipara, aged nineteen, pregnant nine months, who had swelling of the legs and thighs, worse at night; there was a trace of albumin in the urine; the capillaries in the extremities and pelvis were studied by magnifying. There was no lesion of the skin and the blood was pale, with 59 per cent hemoglobin and its coagulation time increased. When the patient was recumbent in the sitting posture, conditions were somewhat better, and when the knee was bent, a better observation could be made through the sole of the foot. The circulation through the capillaries was observed and was found to be bad while the patient was sitting or standing, and good when she was recumbent. A second patient was in the pregnant state and had received treatment for threatened eclampsia, with prolonged rest in bed and limiting the quantity of fluid taken; the edema in her lower extremities had disappeared. When this patient stood up, the circulation was much better through the capillaries.

The two cases were entirely different. In one, the blood passed through the capillaries better while the patient was recumbent, and in the other when the patient sat up or stood. The condition which he describes as angiospasm, he believes exists in 60 per cent of pregnant women, and that this is largely responsible for edema, and this is greatly increased by toxemia. So far as treatment is concerned, whatever will improve the tone of the capillaries is to be desired.

¹ Zentralblatt für Gynäkologie, September, 1921, p. 1361.

Pregnancy Complicated by Prenatal Death. Before the Royal College of Surgeons of Edinburgh, Robinson¹ delivered a lecture on Prenatal Death. By this he meant a normal or necessary extinction of life due to the fusion of gametes (ova and spermatozoa) which, in themselves healthy, in their union produced zygotes not having sufficient vitality to develop and to live. The death of such a product of conception results because it is inherently weak, and this is followed by an abortion which is described in the lecture as normal. Under other circumstances, such union might result in prolonged life, but, as it is, its existence is self-limited. He has studied this in animals and finds that, in some, it varies from 46 to 50 per cent, in others 52 to 62 per cent; these were in so-called thoroughbred animals. In the lower animals not more than 39 per cent to 35 per cent.

In estimating this occurrence in the human subject, one must be careful not to confuse the term stillbirth. Under these conditions the human normal prenatal death rate cannot at present be fixed; but about half of this is due to causes unavoidable at present. Although we may recognize the fact that these deaths are inevitable, this should not lead to a cessation of effort to prevent this and to secure a favorable result. These so-called normal abortions are those which do not, as a rule, come to the attention of the obstetrician, and the only method by which they can be prevented is to increase the scope of prenatal maternal care, together with attention to the general health of the population in every way possible.

Relation of Heart Diseases and Pregnancy. Mackenzie² contributes an interesting and valuable series of papers. After describing the various forms of diseases of the heart commonly seen in pregnancy, he takes up the management of cases of pregnancy with heart disease.

When the heart is efficient, the physician must try to ascertain whether heart-failure is to be expected should a pregnancy occur. The presence of abnormal signs gives no indication of the functional efficiency of the heart. To find out this the physician must observe the patient's condition before and after exercise, ability to go up stairs, lift moderate weights and to take increased muscular exertion. If the heart of the patient is in as good condition as is the heart of the average pregnant woman then pregnancy may be undertaken.

If a woman with undoubted heart disease, such as mitral stenosis, becomes pregnant, she must be kept under close observation, and, if signs of heart failure develop, pregnancy must be interrupted. Such exercise as can be undertaken without effort should be encouraged, but if the patient has trouble in breathing, exercise and effort must cease.

When a patient with an inefficient heart becomes pregnant, she must be examined once each week. The physician should look especially for signs of edema of the lungs. Crepitations at the bases of the lungs, persistent and increasing, indicate developing heart failure. Slight exertion will produce breathlessness; in these cases the patient should be confined to bed or couch and kept as quiet as possible. She should

¹ British Medical Journal, May, 28, 1921, p. 785.

² Lancet, June 4, 11, 18, 25, 1921.

be encouraged to sit up or lie propped-up in bed, for such a posture increases the circulation in the bases of the lungs. She should breathe deeply at intervals during the day.

If heart failure can be kept in check, pregnancy should go to full time. Labor often develops about the seventh month. The writer was accustomed to give chloroform at an early stage of labor to anesthesia in order to restrain the bearing-down efforts of the patient which tax the heart severely. As soon as possible, the patient is given chloroform to complete anesthesia and delivered by forceps. By this treatment the straining seen in the last portion of labor was avoided. The writer gave chloroform freely to his obstetric patients without trouble.

Where heart failure became threatening, abortion or premature labor must be brought on. The writer had induced abortion in patients pregnant from three to five months, suffering with mitral stenosis, whom he had attended in previous confinements from which the patient had recovered with danger and difficulty. In most of these cases which went to the latter months of pregnancy, premature labor came on spontaneously.

In medicinal treatment, drugs of the digitalis group are not efficient unless auricular fibrillation is present; but in mitral stenosis, if the rhythm remains normal, these drugs did no good. If the pulse became very rapid, digitalis should be tried, as it sometimes slows the heart when the rhythm is normal. In auricular fibrillation the good effects of the drug are obtained. It slows the heart in the individual beats, making them strong and effective, improving the circulation. When the heart responds to digitalis and the pulse falls from 70 to 60, the drug should be stopped and not resumed until the pulse rises. When it is found what quantity of digitalis is necessary to keep the pulse at a moderate rate, the patient should take this for the rest of her life to maintain a better pulse. The tincture of digitalis, 15 drops four times a day, is best and the effect will be obtained on the fourth to the seventh day. If the dose is too large, the patient will have nausea, vomiting or diarrhea or feeling of tightness across the chest, or the pulse will become very slow. By carefully noting the effect of the drug, it can be used with great benefit.

In the general management of these cases, whatever throws a strain upon the heart must be avoided. When flatulence is distressing, meals should be taken in a dry state to compel thorough mastication. The meals should be small in quantity and frequent. Sleep is very essential and should be obtained without drugs, but if this is impossible, drugs must be used.

The writer's summary states the case so concisely and clearly that we copy it.

"As the danger attending pregnancy in women with heart disease is the occurrence of heart failure, the physician must keep clearly before him the symptoms by which this can be recognized.

"The absence of a clear conception of the nature of these symptoms has too often led to a misunderstanding of their significance. No sign manifested by the heart itself gives information as to the functional

efficiency of the organ, and consequently the signs of heart failure must be looked for in other directions and more especially in those structures whose blood-supply is likely to be reduced by the weakening of the circulation.

"Extreme heart failure is shown by such signs as dropsy, enlargement of the liver, edema of the bases of the lungs, or cyanosis.

"Early heart failure may be revealed by no sign when the body is at rest, and may only be discovered by distress evoked when some effort is made which the patient was wont formerly to perform in comfort.

"The signs of distress, so far as women in the child-bearing period are concerned, are breathlessness and palpitation. Pain on effort may be present in certain cases of mitral stenosis and aortic disease; but, as a rule, the pain of grave heart failure is a sign which occurs much later in life.

"From this it follows that no single sign shown by the heart itself, however abnormal it may seem, should be a bar to pregnancy.

"Systolic murmurs, no matter in which area they are loudest, should never be a cause of anxiety in pregnancy. If they occur in hearts which show no other abnormal sign, and if the patient's response to effort is good, they should be ignored. If they are associated with other signs of heart disease, the prognosis should be ignored. If they are associated with other signs of heart disease, the prognosis should be based on these other signs and not on the systolic murmurs.

"The same rule applies to the irregular actions of the heart due to respiratory arrhythmia and extrasystoles.

"In women with easily excitable hearts, who suffer at times from pain of varying degrees of severity (the neurotic heart or the toxic heart), when the organ is normal in size, or only slightly enlarged, the heart trouble constitutes no bar to pregnancy. This applies whether systolic murmurs are present or not.

"The form of heart disease which gives most occasion for anxiety in pregnant women is mitral stenosis. This usually has followed an attack of rheumatic fever. In such cases great care must be taken to differentiate between dangerous and not dangerous forms of the malady. The latter include instances in which the cicatrizing process, which produces the stenosis, is stationary or is only progressing slowly. Such slow progress is shown by the character of the murmur. If there is present ten or fifteen years after the causative attack of rheumatic fever only a presystolic murmur, and if the heart's size is normal, its rate regular, and the response of the patient to effort good, then pregnancy may be undertaken with fair prospect of safety.

"If, on the other hand, there is present, within a few years of the causative attack of rheumatic fever, a diastolic murmur as well as a presystolic, there will be danger. This will be particularly the case when there is evidence also of the heart muscle being damaged—*i. e.*, enlargement of the organ and much distress on effort. When, in addition to the mitral stenosis, there is fibrillation of the auricle, pregnancy should be forbidden. If pregnancy has taken place, then the case should be watched; and if grave signs of heart failure occur, the pregnancy should be terminated.

"In cases of aortic regurgitation, if the heart is normal in size and response to effort is good, pregnancy may be undertaken. If, on the other hand, the ventricle is much hypertrophied, and there is a marked 'Corrigan' pulse, the probability is that the heart will be so permanently impaired that it will cripple the patient severely if she gets over her confinement."

Pregnancy Complicated by Myomata. Heimann¹ believes that myomata are present in women who become pregnant, very much more often than is commonly believed. If the tumor is simple, there will be nothing to call attention to its presence during pregnancy or labor. He does not share the belief that these tumors tend to bring about a condition of sterility. He is inclined to take an opposite view that the growth of these tumors is an evidence of the functional activity of the uterus. During pregnancy, such a tumor becomes much more vascular, may grow considerably, and by an increase in its size occasion a complication in labor. During the development of the ovum the presence of such a tumor may interrupt pregnancy, bring about placenta previa, hemorrhage and retroversion of the pregnant uterus. These complications greatly increase the dangers of pregnancy. In labor, still greater interference with the natural processes may occur. Postpartum hemorrhage is not unusual, and may sometimes prove fatal. The diagnosis of the condition complicating pregnancy may be difficult, and the physician must remember, in examining a patient who has a myoma, never to forget the possibility of pregnancy as a complication.

During pregnancy, it is well not to interfere without very good and definite reason. The production of abortion or the induction of labor should not be practised, as they are followed by especially bad results in these cases. Enucleation is also dangerous.

During labor, the physician should give ample opportunity to the natural forces to bring about the birth of the child. Violent interference of any kind should be carefully avoided. If the tumor prevents delivery through the vagina, then Cesarean section must be performed followed by hysterectomy, or the extirpation of the uterus.

He describes two cases which illustrate his opinions.

The first was a multipara, aged forty-one years, who had had three labors, two children having been lost during birth. The patient was seen five months advanced in her fourth pregnancy. A myomatous tumor the size of an apple was attached to the posterior lip of the cervix on its left side and behind. The patient came again to the clinic at the end of pregnancy and the tumor was found to be much larger, so that it completely prevented delivery through the vagina. The patient suffered much from pain and was obliged to remain in bed. Section was performed so soon as pains began; the child was turned and delivered, and breathed promptly. The uterus was closed in the usual manner, and on the following day the patient developed a well-marked bronchitis and died of pneumonia on the third day. Autopsy showed a perfectly clean uterus and abdomen.

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1921, 54, 292.

The second case was that of a patient, aged thirty-five years, who gave a history of excessive suffering at menstruation, and on examining the abdomen a nodular tumor was found, reaching to the borders of the ribs. The cervix was drawn high up. The case was treated successfully by supravaginal amputation of the uterus.

He also describes the case of a patient, aged forty years, who had had six children, with some difficulty in diagnosis as to whether the tumor which was felt was a myoma or was a cornual pregnancy. The sound was very cautiously introduced. When the pregnancy came to an end, it was possible to make out the tumor very clearly. There were strong pains at labor followed by rupture of the membranes and prolapse of the umbilical cord. Version was at once performed and a living child of considerable size safely born. The patient made an uninterrupted recovery.

Toxemia of Pregnancy. INCREASED AMOUNT OF URIC ACID IN THE BLOOD IN THE TOXEMIAS OF PREGNANCY. Williams¹ summarizes the chemical study of the blood in patients having the toxemia of pregnancy. Twenty-five patients were studied, some of whom had eclampsia; others toxemia without eclampsia, and some with pernicious vomiting of pregnancy. The blood of these patients was compared with that of six pregnant women, who presented no abnormal symptoms. In all toxic patients, the uric acid was greatly increased. When the patient was delivered and recovered from labor, the amount of uric acid in the blood gradually returned to normal. There is always increase in arterial tension in pregnancy, when the quantity of uric acid is increased. In the toxemia of pregnancy which causes vomiting, uric acid in the blood is greater than normal. Where the vomiting arises from reflex or nervous causes, the uric acid does not increase.

THE VALUE OF RENAL FUNCTIONAL TESTS IN THE DIAGNOSIS OF TOXEMIAS OF PREGNANCY. Wallis² has analyzed the urine of pregnant women and has made tests concerning the renal functions. He also studied a number of cases of the toxemia of pregnancy and has found that the application of tests for renal function gives results of diagnostic value in the albuminuria of pregnancy. By this is probably meant the toxemia of pregnancy, which is of nephritic variety. In the toxemias of pregnancy he finds that the most reliable test is the diastase estimation in the urine. This gives results considerably higher than those usually regarded as normal. When albuminuria is present, the ratio of albumin to globulin in the urine is of diagnostic importance. The results obtained in this study in the toxemias of pregnancy show that the toxins are present in the blood of the mother, exerting their primal influence on the bloodvessels, producing in the kidney an acute process. There are four tests which are of practical value; the determination of the quantity of diastase in the urine and the ratio of the albumin to the globulin in the urine; the urea content of the blood, and the urea concentration test. All of these give considerable information in cases of toxemia of the nephritic variety. The results must be estimated from

¹ Journal of the American Medical Association, May, 1921, p. 1297.

² Journal of Obstetrics and Gynecology of the British Empire, 1921, 28, 3.

a considerable series of cases, and when all these tests are used, as no single test gives sufficient data to enable one to accurately estimate the condition of the excretory organs.

CEREBRAL HEMORRHAGE COMPLICATING TOXEMIA OF PREGNANCY. Ranzel¹ reports the case of a primipara with acute nephritis, who became comatose without convulsions. She was delivered by Cesarean section of a viable child. She did not regain consciousness and died shortly after. At autopsy, there was hemorrhage in the frontal lobe of the brain.

A FATAL CASE OF ACUTE HEMORRHAGIC HEPATITIS FOLLOWING TOXEMIA OF PREGNANCY. Banister² reports the case of a woman in her second pregnancy admitted to the hospital in labor in a very excitable and restless condition, with feeble pulse and slightly raised temperature. She had been ill for two weeks, with vomiting, abdominal pain, slight diarrhea and swelling of the legs, but her principal symptom had been intense restlessness and mental disturbance. The quantity of urine passed was lessened, and there was great thirst, frontal headache, and epigastric pain. There was swelling of the lower extremities; the patient was sallow but not jaundiced. The urine contained a large quantity of albumin. As the patient was suffering considerable pain, she was given morphine and hyoscine and a little chloroform during the labor. On the following morning, jaundice and pain developed, especially severe in the left shoulder, with vomiting of blood. The abdomen was rigid and tympanitic; urine was very scanty and highly colored. Incessant "coffee-ground" vomiting with streaks of bright blood was present. The urine contained blood and blood-pigment, with large quantities of albumin and some bile. There was no urea estimation. Liver dulness was lessened. There was continual slight bleeding from the uterus which could not be controlled, and forty hours after delivery the patient died in coma. At autopsy, the essential changes were found in the liver; it weighed fifty-six ounces, was somewhat light in color, and had areas of hemorrhage throughout its substance and beneath its capsule.

Pregnancy Complicated by Accidental Hemorrhage. Ley³ had under observation 50 cases of pregnancy complicated by accidental hemorrhage. As regards the cause of these accidents, among the writer's patients traumatism could not be found to be an essential cause. The Wassermann reaction was positive in only 1 of 15 cases, and syphilis could not be said to be an essential factor. The one important element present and preceding the hemorrhage was albuminuria indicating a toxic condition. In but 7 of the series was there external hemorrhage. Hemorrhage in these cases is never severe and usually slight. There are no labor pains, and fetal heart sounds are absent in half the cases, and vaginal examination is negative. The placenta cannot be felt. If the symptoms of toxemia are present, it is very suggestive.

So far as treatment is concerned, if heart sounds are reasonably good and the patient in good condition, rest and the hypodermatic use of

¹ Zeitschrift für Geburtshülfe, 1921, vol. 82.

² Journal of Obstetrics and Gynecology of the British Empire, 1921, 28, 147.

³ Ibid., 69.

morphine will often result in the continuing of the pregnancy. The statement is made that if considerable blood has been lost, labor pains will always be present; then the membranes should be ruptured, and a tight binder applied and a hypodermatic injection 1 cc of pituitrin given. To prevent further hemorrhage, the vagina should be plugged with gauze, and, before packing, the vagina should be dried and swabbed out with iodine, and dry, sterile gauze used in packing. The writer believes, however, that there is danger of rupture of the uterus through a necrosed area by this method of treatment, and this happened in 1 of his cases. So far as the results are concerned, half the children were stillborn. The results for the mother are good if the patient is taken promptly in hand, then severe hemorrhage is avoided. The treatment described has been applied by the writer to those cases which he calls uteroplacental hemorrhage, which is external.

When the hemorrhage is internal and the blood is retained, the symptoms are a more sudden and severe, pain, which produces intense suffering or shock, sometimes with vomiting. The patient grows pale and often has attacks of fainting. The uterus is large, harder than it should be, usually tender. The cervix may be undilated, or may admit several fingers; the bag of waters is tense, but not bulgy. The fetal parts cannot be made out, and in all the writer's cases there was albumin in the urine and frequently granular and hyaline casts. So far as the treatment of these cases is concerned, the patient should be put at rest and given morphine. If hemorrhage becomes external, the patient may be treated in the manner already described. If this does not suffice to control the case, delivery by abdominal Cesarean section is indicated. At this operation the uterus should be carefully examined to detect the presence of partial ruptures in the uterine substance.

In his series of 50 cases there were 7 of retroplacental hematoma. In these the hemorrhage was entirely behind the placenta, and there was almost no external bleeding. This accident is frequent in cases of chronic nephritis.

In the 50 cases there were 25 of the combined variety in which albumin was present; in 22 definitely absent. Hyaline and granular casts were often seen. The symptoms are the combined symptoms of the external and internal variety.

When these cases are classified there were 7 of external bleeding with 28 per cent of cases having albuminuria, no maternal mortality, and 56 per cent fetal mortality. Of the cases of internal bleeding, there were 11, all of whom had albuminuria; with a maternal mortality of 18 per cent; a fetal mortality of 100 per cent. Of combined bleeding there were 25, with 88 per cent albuminuria; maternal mortality 4 per cent; fetal mortality 88 per cent. Of retroplacenta hematoma there were 7 cases, all of whom had albuminuria, none of the mothers dying and 42 per cent of the children.

The results of the treatment are not stated clearly, but it is indicated that various sorts of treatment had been carried out. The writer calls attention to the fact that with an internal hemorrhage, when delivery is accomplished by Cesarean section, care should be taken to inspect the

uterus for the presence of softening of the uterine wall. Should this have developed to any considerable extent, it may be necessary to perform hysterectomy.

HYSTERECTOMY FOR ACCIDENTAL HEMORRHAGE. Shaw¹ reports 7 cases of accidental hemorrhage complicating pregnancy, treated by hysterectomy. His first patient was a multipara with a high percentage of albumin in the urine. There had been a severe hemorrhage for which a tampon had been applied. After coming into the hospital, labor began and a dead male child was delivered. Hemorrhage persisted and hysterectomy was performed with the hope of saving the patient. Three days after the operation, diarrhea began, with very offensive movements containing undigested milk. The patient died of exhaustion, having had very slight disturbances of temperature and remaining mentally clear. At autopsy, the intestines were very much injected and contained very foul, thin, watery, yellow material. The right ureter had been caught in a ligature and the kidney and the ureter were distended. The kidneys were apparently healthy. The lungs were edematous. The heart was normal. The uterus was enlarged, deep red, almost black, and showing on the posterior surface a number of cracks extending through the peritoneal coat.

The second case was aged forty-one years, a multipara at seven months. There had been a considerable amount of albumin in the urine. The patient had been taken with sudden hemorrhage in the early morning, but was not sent to the hospital until almost midnight. She did not enter the hospital, however, until seventeen hours after the hemorrhage began. Operation was performed as soon as possible, and a half pint of free blood was found in the abdominal cavity and a large hematoma in the left broad ligament. The uterus was distended, very tender, and there was no sign of external bleeding. She was operated upon as soon as possible, but died fifteen minutes after the operation. The uterus was distended with blood and the placenta completely detached. There was no free blood in the peritoneal cavity, but in both broad ligaments.

Case four was a multipara in her ninth pregnancy, advanced eight months. Like others, she too had albuminuria and hemorrhage. This came on suddenly, while she was in bed early in the morning, grew gradually better but did not cease entirely and continued during the day. The patient was very pale and weak on admission. When section was performed the uterus was full of clotted blood; the placenta entirely detached. The child was dead. The patient was so anemic that there was no bleeding from the uterine incision. As is usually the case, there was a hematoma. It was very difficult to control the bleeding on the left side, as the vessels were lost in the clot. At the conclusion of the operation, the patient's pulse could not be felt. In spite of her desperate condition, she gradually recovered and finally left the hospital in good condition.

In another case there was free external bleeding. The patient

¹ Journal of Obstetrics and Gynecology of the British Empire, 1921, 28, 135.

was near term, had severe external hemorrhage, and a district nurse had seen the patient before admission. She was in a desperate condition; the uterus could not be made to contract and hysterectomy was performed. There was no free bleeding in the peritoneal cavity, no hematoma in the broad ligaments. The uterus was full of clots; the placenta was completely detached. The uterus made no attempt to contract after the extraction of the child. The operation was done without haste, and two ligatures were placed round the uterine and ovarian arteries. The patient died from shock some hours later, and on examination it was found that the ligatures around the right uterine artery had slipped and that the patient had bled to death.

He also narrates a case of marginal placenta previa, in which the placenta could be felt high up on one side. Podalic version was performed, followed by collapse. It was then seen that the case was not one of placenta previa but one of accidental hemorrhage. Albuminuria was present; the child was extracted and an effort made to cause the uterus to contract, but this effort failed. Vaginal hysterectomy was then performed with the use of clamps. The patient did not survive the operation more than one hour.

In performing hysterectomy the operation was done as rapidly as possible; one of the operations was completed in fifteen minutes. In some cases clamps were used to save time. The final result of the 7 cases was 4 deaths and 3 recoveries. Of the Cesarean hysterectomies, 5 in number, 2 died and 3 recovered. Mortality rate was 57 per cent, but those who recovered would undoubtedly have died had not the operation been performed. All the children were dead, as the placenta were completely detached. It was interesting to note how frequently blood was found in the broad ligaments and how greatly altered in color and consistence was the uterine muscle. When the tissues were examined, it was found that there was an increased amount of elastic and fibrous tissue around the bloodvessels of the uterus. This was in excess of what is often seen in multiparous uteri. The writer believes that this is the result of the toxemia and hemorrhage and not the cause. As has long been recognized, albuminuria was constantly present. The lesson of the cases is the fact that the condition is so serious that the risk of operation should be undertaken at once.

Placenta Previa is the subject of consideration by Liegner and Krause.¹

Liegner, in the clinic at Braslau, has been impressed with the difficulty of ascertaining the quantity of blood lost by a patient who has placenta previa. He is especially interested in ascertaining, if possible, what influence the bleeding, which occurs at various periods of labor, has upon the mother. There have been in the clinic 113 cases of placenta previa in twenty years, and the mortality from hemorrhage alone has been variously estimated as 3.3 per cent to 2.3 per cent. Of the 113 cases, 10 proved fatal, 8.9 per cent; of these, 4 died of hemorrhage. This gives a mortality from hemorrhage of 3.5 per cent. One of them had suddenly developed shock six hours after labor. Another had a

¹ Zeitschrift für Geburtshülfe und Gynäkologie, 1921, **82**, 341 and 413.

severe laceration of the cervix; of these, the first was exsanguinated when she came into the clinic, while the other in the beginning of labor had a severe hemorrhage, losing one and one-half to two pints of blood.

One of these, a multipara, aged twenty-three years, had hemorrhage six weeks before labor and also five days before labor; she was admitted exsanguinated in labor; the case was comparatively simple because the placenta was perforated, the child turned and delivered. The delivery of the placenta was accomplished without hemorrhage, although a portion of the placenta was left behind and was removed manually. This patient died sixteen hours after labor, and at autopsy there had been minute hemorrhage into the heart muscle and fatty degeneration of some of the muscle fibers.

The second case, a multipara, aged thirty years, had bleeding two weeks before labor and on three other occasions had profuse hemorrhage. She entered the hospital just after one of these hemorrhages. She was pale, with a small, weak pulse. A dilating bag was inserted, followed by a moderate hemorrhage; a tear in the cervix was closed, but in spite of treatment the patient died three hours later. Autopsy showed extreme anemia of all the organs. The first case illustrates the influence of the hemorrhage in the fatty degeneration of the heart muscle which developed.

It is interesting to note how often bleeding occurs during pregnancy in cases of placenta previa. In the writer's series of 113 cases, there was hemorrhage during pregnancy in 69; that is, 61 per cent. In 33 cases where the placenta was situated very low in the uterus, 15 had hemorrhage during pregnancy. The greater the area of placenta which is over the os, the greater the danger of hemorrhage in placenta previa. In 39 cases of partial placenta previa, there was hemorrhage in 23. In 41 cases of central placenta previa, there was hemorrhage in 30. One-fourth of the cases narrated were total placenta previa, with bleeding during pregnancy. The writer analyzes the various aspects of bleeding during pregnancy and placenta previa; there is ample evidence that such bleeding is of great importance to mother and child. The loss of blood very seriously injured the mother and the primary purpose of treatment in these cases should be to control or prevent hemorrhage. More than half of the patients having placenta previa have hemorrhage during pregnancy. A careful examination to determine the source of the bleeding is clearly indicated. The greatest danger to which the patient is exposed in placenta previa is the interference of a physician. Hemorrhage in the period of placental delivery is less dangerous than this. In some cases which have survived the hemorrhage before labor, the repetition of the bleeding after labor can often turn the scale against the recovery of the patient. The anemia which accompanies such hemorrhage lessens the resisting power of the organism and increases the liability to complications during the puerperal period, and to septic infection. Cases of placenta previa should be thoroughly examined before leaving a hospital to determine how great has been the injury produced by hemorrhage. In order to study these cases completely, an effort should be made to measure accurately the quantity of blood

discharged and also the percentage of hemoglobin in the blood during various stages of the delivery.

Krause writes concerning the subject of *cervical placenta previa*. He describes the case of a patient, a multipara, who in previous labors had manual delivery of the placenta. In the last previous labor, she had placenta previa and manual delivery. During the present pregnancy, she had three hemorrhages, of which the last was severe. For this a physician inserted a tampon and brought the patient to the hospital. On admission, she was found to be in the eighth month of pregnancy with a breech presentation. On examination, the abdomen was greatly distended; the head of the fetus freely movable at the fundus; the heart sounds could scarcely be heard and on internal examination the cervix was high up, admitting two fingers and very soft. At the internal os could be felt a comparatively firm, irregular mass of tissue. The placenta was attached around the margin of the os. The examination seemed to produce little bleeding and, accordingly, a tampon of iodoform gauze was firmly applied. The patient was delivered by Cesarean section. A portion of the placenta was under the uterine incision, but there was no hemorrhage. The child was eight months advanced and perished after making a few feeble efforts at respiration. There was no hemorrhage after the removal of the child, but the entire lower half of the uterus was filled by an unusually large placenta. When the attempt was made to separate the placenta, it was found difficult, as it was firmly adherent to the posterior wall of the uterus and to the edge of the internal os. As soon as the placenta was removed, hemorrhage ceased. The uterus contracted fairly well. The uterus was immediately closed by careful approximation. The pulse of the patient had been bad before the operation, but, after the removal of the child, it became worse and the patient died. The operation was done under lumbar anesthesia.

Autopsy showed the uterus unusually large, filled with blood and blood clots, and the clots were very firmly adherent to the lower portion of the uterus and cervix where pieces of placenta were firmly attached. This placental tissue extended deeply into the muscular wall of the uterus. A detailed account of the postmortem appears as given, and it is especially interesting to note that the muscular and connective tissue of the uterus was infiltrated with small cells, especially among the vessels where were found masses of cells from the chorion. Fetal elements had also penetrated the tissues, and in some places the muscle showed beginning hyaline degeneration. The appearance was strongly suggestive of the development of chorioepithelioma. The placenta filled the entire lower portion of the uterus, being firmly adherent to the uterine wall. On the left side it had penetrated the tissues deeply. The microscopical study showed that the case was a cervical placenta previa.

The writer quotes 4 cases from the literature, in all of which the placenta was firmly adherent; 18 of these cases are quoted in which the placenta was unusually adherent. Six of these patients died of hemorrhage; 2 died after delivery; all of them were multiparæ and the mortality was high.

So far as treatment is concerned, it is evidently difficult to control the hemorrhage. Where but little placental tissue is attached to the cervix, this may be done; but, where much placental tissue is firmly attached to the cervix, it is very difficult. In some cases treated successfully, the extirpation of the uterus has been the remedy.

Raynaud's Disease and Pregnancy. Silberstein¹ refers to Raynaud's description, in 1862, of a disease characterized by symmetrical gangrene of the extremities. He distinguished three stages of the disease, local syncope, local asphyxia and symmetrical gangrene. He recognizes the fact that the disease began in paroxysms, and that it could be produced by changes in temperature and by violent nervous shock.

The writer reports the case of a woman, aged twenty-two years, with a history of tuberculosis in the family. The patient had measles and diphtheria. During her first pregnancy she had an attack of grippe for which she was eight days in bed. When she recovered and attempted to do her house work, she suffered greatly from weakness. About six weeks after the attack of grippe, she suddenly had a chill and sharp pain on the right side of the chest on breathing. At evening she had high fever, and the physician who saw her diagnosed pleurisy. She was ill in bed nine days, with high fever, cough and bloody expectoration. She had no night sweats, no vomiting, no diarrhea. The urine became highly colored and cloudy, and was found to contain albumin; the quantity passed daily was normal. Both the feet became symmetrically swollen but the swelling gradually disappeared. Later on, the patient, in doing house work, had her hands in cold water, when both hands became blue and swollen; this disappeared. After a few days the ring finger and little finger of the left hand became very painful and dark blue in color. This extended to the other hand, then to the toes of both feet, then both hands and the back of the feet became swollen. The patient was then admitted to the hospital, and it was stated that in cold weather she had been accustomed to suffer greatly from cold feet and had been obliged to wear woolen stockings at night. A careful examination was made of the patient. Dulness and abnormal breath sounds were found over the chest. The hands were swollen; the fingers dark in color and so were the feet. The sensibility of the swollen limbs was greatly diminished. A complete diagnosis was made of pregnancy, pleurisy on the right side, glomerulo-nephritis, Raynaud's disease and hemoglobinuria. A Wassermann test was negative. Examination of the fingers and toes by the Roentgen ray was also negative. A very minute examination was made of the urine and blood. Blood was found in the urine. The patient's general condition grew progressively worse. Hemoglobin was 45 per cent; red cells 2,500,000; the nephritis became worse and the quantity of blood in the urine increased. Accordingly, under anesthesia, the cervix was dilated and a dilating bag introduced. A premature child was expelled spontaneously, followed by the placenta. After delivery, the same local manifestations persisted and the patient's hemoglobin fell to 34 per cent; the child became severely jaundiced, with

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1921, **84**, 208.

attacks of asphyxia, in which it died. Autopsy showed diffuse bleeding into both lungs, and beneath the capsule of the liver on the right side. The general condition of the mother improved. The fingers and toes, however, remained abnormal and gradually became gangrenous. The tips of the fingers and toes were spontaneously separated.

In making a differential diagnosis, one must consider the effects of ergot when given to parturient women. Ergotine sometimes acts as an intense poison on the bloodvessels and may produce a spasm of the vessels, causing the symptoms seen in Raynaud's disease. In the case reported the patient had not taken ergot or ergotine, and hence the effect of that drug could be ruled out. Other cases are reported in which Raynaud's disease was present with paroxysmal hemoglobinuria. The anemia present was secondary to the original disease.

So far as the cause of the condition is concerned, it undoubtedly resulted from several causes. One was the infection of influenza and pleurisy. Another the condition of the kidneys; and another the nervous shock to which the patient was subjected. In the case reported, the pregnancy was not the cause of the disease of the kidneys, for this was produced by the infection of influenza. While it may be difficult to prove that pregnancy alone may cause this disease, it undoubtedly predisposes to it. Few patients who are pregnant escape toxemia in some degree, and this produces a condition favorable for the development of this disease. The writer states that the interruption of pregnancy is not the cause of Raynaud's disease, but the cause of the condition of the kidneys. Attacks of local blueness in the extremities of pregnant patients should always suggest the development of this disease. As a rule, the writer believes that pregnancy should be interrupted in the presence of acute infection. The postmortem findings in the child were evidently those of toxemia.

The Cause and Significance of Dropsy Complicating Pregnancy. Fink¹ has studied the development of swelling or dropsy in pregnant patients. His material was 150 patients in the clinic at Königsberg and 200 polyclinic cases. It is interesting to know that in 95 per cent of pregnant women, he found dropsy to some extent present. Plainly demonstrable swelling could be observed in only 80 per cent. If patients are examined in the afternoon when they have been moving about actively during the day, most pregnant patients will show a slight swelling of the lower extremities. In making these observations, patients were measured in a routine manner. One measurement was taken around the neck at the larynx, another around the upper arm at the insertion of the deltoid muscle, another around the forearm at its thickest portion, the circumference of the chest while the patient was lying down, and also the circumference of the leg at its smallest portion. These measurements were repeated with the same patients after the birth of the child. The result showed that three or four hours after the birth of the child the swelling of pregnancy had diminished by 1 cm. This symptom of swelling is present in marked degree in some toxic cases and in those

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1921, 84, 2.

in which the kidneys are especially at fault. This phenomenon is seen quite as much among patients in comfortable circumstances where the conditions are favorable for maintaining the circulation. Pregnant patients who have heart disease and those who have varicose veins often show no swelling. It seems as if hard work, improper clothing and bad surroundings have nothing to do with this condition. The writer could, however, trace a connection between this swelling and very free use of salt or of acids in the food of the individual. He describes the case of a multipara who, in the first, second and fourth pregnancy, had extreme swelling, and in her last confinement eclampsia. During her third pregnancy she remained healthy and free from swelling, although she did hard work up to the time of her confinement. It is questionable whether the kidneys are always involved to some extent in these cases. The fluid which creates the swelling can come from the bloodvessels into the connective tissue, and this would indicate an unusual pressure in the vessels. Experiments made on animals and observations on the human being point to the influence of salt in the food as the probable cause of this condition. The writer describes the case of a patient who, from the time of her confinement to the sixth day afterward, lost in weight 13.9 kg. The weight of the contents of the uterus is estimated at 5.28 kg. and the weight of the increased quantity of urine voided is estimated at 2 kg. In these six days the patient took 8400 cc of fluid and voided 10,200 cc of urine. During this time she had no fever nor was there profuse sweating nor diarrhea, and it is fair inference to conclude that she had retained in her tissues the amount of fluid whose weight is recorded.

The study of these cases indicates that the greatest number of patients having edema retain fluid in the subcutaneous tissue of the lower extremities. Others show swelling of the face or about the genital organs, and in other cases internal organs undoubtedly became swollen such as the kidneys. The mechanical conditions pertaining to the renal circulation are such that swelling is especially likely to occur in the kidney. It seems also probable that the increased blood pressure in these patients and also the capacity of the tissues to take up water bring about the condition, so that the blood often has no ready means of getting rid of these substances, which should be removed from the blood. When blood pressure is not increased, although swelling is present and albuminuria is also present, the subcutaneous tissue is not receptive to water and other substances. Pregnant patients having edema are frequently not ill and complain of nothing except the inconvenience occasioned by increase in size. They have all the symptoms of the kidney of pregnancy, but manifest no sign of toxemia. One must recognize in this condition a stage in which genuine toxemia is not fully developed. Evidently, with these patients, the congested state of the kidneys may disappear after the birth of the child or may become aggravated to a permanent condition. There is evidently some connection between eclampsia and congested kidneys. The condition present in swelling affects to some extent the brain and renders it more likely to unnatural irritation. The writer advises, in toxic cases, that the patient be confined to her bed and given a salt-free diet with a limited quantity of fluid only.

Influence of War Upon the Sex of Children Born During that Time. Gänssle¹ has studied this question in view of recent evidence. He quotes Alfeld's conclusions that very young primiparæ more frequently give birth to boys. Primiparæ in a condition of full and vigorous blood produce more female than male children. Primiparæ older than thirty produce more male than female children. The writer found it difficult to demonstrate the positive influence of war conditions upon the sex of children. It seemed a question of the conditions present in the individual at any given time rather than the presence or absence of war.

Death after Abortion from Hemorrhage. Pribram² states that most authorities believe that there is very little danger in abortion from hemorrhage. Hemorrhage reduces the resisting power of a patient to infection and most cases of abortion in which hemorrhage is excessive develop infection, but from hemorrhage alone it is very rare to observe a fatal issue.

The writer reports the case of a woman, aged thirty-six, years, who had passed through eight labors—three of them terminated by the use of forceps. She had good general health. Menstruation developed at seventeen the last period having been about four months previous, but at the time of admission she was very anemic and badly nourished. The heart and lungs were apparently normal; the urinary sediment contained nothing of importance; the patient's hemoglobin was 36 per cent; the abdominal wall was relaxed, and the external genitals indicated a multipara. There was a bloody serous discharge. In the vagina were three small cotton tampons. The fundus was four fingers breadth above the symphysis; the cervix was soft and the os admitted three fingers. A blood clot as large as a fist was easily expressed from the uterus. No hemorrhage followed this, and the patient was given pituitrin and ergot. According to her account, she was five months, pregnant. She had not yet felt life, but for three days before coming to hospital she had suffered from severe abdominal pain and had remained in bed. There had been a very considerable discharge of dark, clotted blood. The hemorrhage would persist through the day, then grow suddenly worse at evening, the blood would become bright in color. There was no evidence that pieces of the embryo had been discharged. The husband asserted that the patient had made an attempt to produce an abortion. A smear was taken from the cervix and the patient's temperature found to be 99.5° F. As hemorrhage had ceased, no interference was practised. On the following day the patient seemed no better and was again given ergot and pituitrin. There was a constant, although not excessive, discharge of bloody fluid. During the following night the patient got out of bed, when a clot of blood the size of a child's fist was discharged without further bleeding. The patient collapsed and reacted very feebly to stimulants. The hemoglobin was 22.6 per cent; temperature 96.5° F. One could find no symptoms of intra-abdominal bleeding. The patient was given very little ether; three fingers were introduced through the cervix when a very fetid, necrotic placenta was discovered

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1921, **64**, 159.

² Zentralblatt für Gynäkologie, 1921, No. 41, p. 1483.

upon the posterior wall of the uterus. This was loosened by the finger and removed. A little placental tissue and some small portions of placenta remained behind. A dull curette was employed on the posterior wall of the uterus. The patient did not lose blood during delivery. The uterus contracted well and there was no postpartum hemorrhage. She was given stimulants freely and reacted somewhat, but two hours later collapsed and died.

Bacteriological examination of the smear taken from the cervix showed that it was sterile. Autopsy showed great anemia; an enlarged and soft spleen; the uterus as large as a child's head. The uterine muscle was pale and relaxed; the membrane of the uterus was covered with pale, grayish-red granulations; the cervix was widely dilated and somewhat lacerated. The heart was normal; there was edema at the bases of both lungs.

The autopsy showed that the death had resulted from a very severe secondary anemia. The worst of the hemorrhage had taken place while the patient was at home. Comparatively little blood had been lost while she was in the hospital. Active interference had been postponed because there was rise in temperature and awaiting the result of the bacteriological examination. The fact that the discharge was comparatively slight and was a serous, bloody fluid masked the gravity of the patient's condition. The rapid drop in hemoglobin from 36 to 26.2 and finally to 22 per cent showed that the patient had reached the point where the slightest additional blood loss would probably be fatal. The emptying of the uterus was too late. The lesson in the case is that in a case of abortion with active hemorrhage, the uterus should immediately be emptied.

Eclampsia. Oettingen¹ has studied the origin of eclampsia and describes the case of a woman, aged twenty-nine years, in her fourth pregnancy, who had had a placenta previa at eight months. She had suffered from rheumatism, and mitral disease and on this had been grafted nephritis. On admission to hospital she was fairly nourished, with general dropsy at eight months pregnancy. There was marked edema in both legs, back, hands and eyelids; the urine contained abundant albumin, with hyaline and granular casts and some blood cells. There was a mitral systolic murmur but the heart was not enlarged. The blood-pressure was 170 mm. The patient was put in bed on limited diet and given a mixture of sodium chloride and sodium carbonate dissolved in distilled water. This was given by rectal and intravenous injection. The proportions of sodium chloride and sodium carbonate in distilled water as given by rectum were 14 of sodium chloride, 20 of sodium carbonate in 1000 parts of water. For intravenous injection 14 parts of sodium chloride, 10 parts of sodium carbonate in 1000 parts of water were employed. These solutions were tested upon animals and also upon the patient's blood to observe the effect, they produced no hemolysis. The patient at first suffered from headache, restlessness, pain, and 16 per cent albumin in the urine. There was marked diminution in the quantity

¹ Zentralblatt für Gynäkologie, 1921, No. 42, p. 1510.

of urine passed, and the general symptom increased in severity. Following the intravenous dose, the quantity of urine increased and the rectal dose produced a thin movement of the bowels. The albumin was 18 per cent; the patient felt somewhat better. Albumin dropped to 12 per cent, with increased secretion of urine. Albumin then rose to 20 per cent, followed by labor. A child weighing 900 gm. was born and survived its birth but a few hours. On the seventh day after labor the patient had but 4 per cent of albumin; she was then transferred to a medical ward.

The second patient treated in this manner was a woman, aged forty-two years, in her twelfth pregnancy. The previous pregnancies had been without complications. She was eight months advanced and since the fifth month the urine had been abnormal. Two weeks before entering the hospital, she had cough and eight days previously fever, with chills and rapid increase in the size of the abdomen.

On examination, the patient was strongly built, fairly nourished but the face was dusky in color. Breathing was very labored, but there was no edema. There was no pathological condition in the heart. Both lungs showed diffuse, dry rales with some dulness on the right side and behind. The pulse was 124, tension normal; the temperature was 104° F.; blood pressure 130; the urine was dark brown in color; albumin was present; there were no casts but many leukocytes. The circumference of the abdomen was 118 cm. The abdominal wall was greatly distended; the head of the child was presenting and very freely movable; heart-sounds could not be heard. The pelvis was of average size. Evidently the patient had bronchitis, with congestion at the base of the right lung, and also polyhydramnios. The treatment was given as in the preceding case, and on the fifth day the temperature was normal and the bronchitis had disappeared. There was not much albumin in the urine but the bile salts in the urine were abundant. The alkaline solutions were given intravenously. The patient improved so much under the treatment that she insisted upon going home for her confinement.

TEN YEARS' EXPERIENCE IN THE CONSERVATIVE TREATMENT OF ECLAMPSIA. Lichtenstein¹ contributes a paper at some length containing tabulated reports of his cases and giving his experience in the ten years from April 1, 1911, to March 31, 1921, in the conservative management of eclampsia. In 1911, he published his results in the treatment of 400 cases, with an average mortality of 16.67 per cent. Up to that time he had followed extensively the various operative procedures which had been recommended in the treatment of eclampsia, with the results as stated.

The series which he now reports include 317 cases, in whom eclampsia occurred before labor in 80, during labor in 175, and after labor in 62. He first speaks of what he calls intercurrent eclampsia and gives in a table the interval elapsing between the last convulsion and the patient's confinement. This interval varies from a twelve hour period up to twenty-seven to thirty-six days. These cases were 101 in number,

¹ Zentralblatt für Gynäkologie, 1922, No. 1, p. 5.

with maternal recovery rate of 39.6 per cent and an examination of the table shows that the greater number of cases were those in which labor came on within twenty-four hours of the first convulsion; in 4 patients, however, confinement did not occur until from twenty-seven to thirty-six days after the cessation of the convulsions. When the period is taken during which eclampsia develops before labor and not during labor or immediately after labor, it is found that the same intervals practically obtain. The patients in whom eclampsia developed during labor, were many of them delivered by operation, the percentage being one-third, while two-thirds gave birth to the child spontaneously. Many of these cases were those which he had formerly treated by vaginal Cesarean section, but his results without the operation were very much better. He quotes Fromme's statistics of 58 cases with early delivery, with a mortality of 12.1 per cent. In his own series of similar cases, numbering 80, his mortality was 5 per cent, and by eliminating from this some cases which had not seemed to be fairly included, he reduces the mortality to 3.75 per cent, leaving 96.3 per cent of cases which recovered. He gives some interesting histories of patients extremely ill and comatose for some time who finally recovered.

Among his patients, 3 died without delivery; of the remainder, 58 per cent had spontaneous labor, 42 per cent he delivered by some operation, among these were 10 cases of breech presentation and 27 cases of twin pregnancy.

Forceps or version was employed, although not with a remarkably high percentage; but once was vaginal Cesarean section practised on a moribund patient who died during the operation. Five times abdominal Cesarean section was done for pelvic contraction, enlargement of the thyroid, profound asphyxia, brow presentation and the sudden onset of eclampsia while the child was still living. It was necessary to help with the dilatation of the cervix in 16 cases, and there were other minor complications. In 2 cases the use of forceps was accompanied by serious lacerations, injuring the cervix to such an extent that peritonitis developed in 1 case. He quotes the statistics of three other clinics showing a considerable percentage of deaths after delivery by vaginal Cesarean section and other obstetric procedures. In contrast to the complications and accidents which accompanied delivery by operation was their absence after the conservative treatment. Patients recovered uninjured and most of them recovered at least comfortable health.

When the mortality of the children is considered, and cases are eliminated where the child was premature or the circumstances were such that it had no chance for life, 202 children were born with a fair prospect of surviving; of these, 38 perished, a mortality of 18.8 per cent, to be placed in contrast with a mortality of 36 per cent following active delivery. The mortality of the mothers of 316 was 8.5 per cent, a diminution in mortality of 1.10 per cent over that obtained by other methods of treatment. The various complications which occurred in these cases were those usually seen in toxemic patients and there is nothing of especial interest in this part of his paper. He gives a tabulated report of 25 cases thus complicated, and 3 cases in which the patient

had eclampsia after labor with complications. All of these came under the usual pathology of toxemia.

So far as his treatment was concerned, he has made some changes in the narcotics which he employs, in place of morphine he uses pantopon and also laudanum, no reason is given for the change nor is any account given of the difference between these substances and morphine and laudanum. He relies very largely on bleeding, and before labor he removes from 500 to 600 ccm of blood, or, if the patient is coming into labor, he takes one-half of this quantity. When dilatation is complete and circumstances are favorable, he helps delivery and allows the patient to bleed from the uterus. When the toxemia is profound, he bleeds immediately after labor, taking from 500 to 600 ccm., a larger quantity is removed in cases where eclampsia develops during the puerperal period; while in those patients seized with convulsions before labor, a smaller quantity is removed. If the necessity arises, he repeats the bleeding. He believes that bleeding helps patients by removing poisons with the poisoned blood, by lessening blood-pressure where it is high, and by helping to prevent edema and encouraging the excretion of the urine. He draws attention to a recent experiment by Nevermann¹ who employs capillary tubes to measure blood-pressure and injected ovoglandol into the animal the subject of experiment. This experiment showed that bleeding, in cases of disturbance of the genital organs, tends to restore the balance in economy more rapidly than any other method of treatment.

He also lays stress upon the fact that if the patient is relieved of poisoned and cyanotic blood, oxygenation goes on much more rapidly. He quotes a number of authors in support of this; evidently an important phase in the toxemia of pregnancy is the lack of oxygenation. After bleeding, he hesitates to introduce a large quantity of salt solution or other material into the circulation, he believes that this is conducive to edema of the lungs and impairs the strength of the heart; when the patient has been very edematous, he especially warns against it.

His treatment is directed to the toxemia and not with the view of rapidly emptying the uterus. The result of his treatment he sums up by stating that in many cases eclampsia runs its course and the patient recovers without going into labor, and that this naturally is the result to be desired. If interference is not practised, the patient is spared infection, lacerations and indefinite hemorrhage. The patient is also relieved from the secondary results, such as fistula, scars in the cervix, and serious lacerations. The mortality for mothers and children is reduced about one-half from that previously obtained by active interference.

The conservative treatment can be better carried out by the general practitioner of medicine than the operative treatment.

Ectopic Pregnancy. REPEATED ECTOPIC PREGNANCY. Palmer² reports an extraordinary case of a patient, aged forty-seven years, operated upon in 1902 for a ruptured ectopic pregnancy on the right side, with

¹ Zentralblatt für Gynäkologie, 1921, No. 17.

² Journal of the American Medical Association, March, 19, 1921.

removal of the right tube and ovary. Following this operation the patient had five living children and one stillbirth. Twelve years after the first ectopic pregnancy, the patient being then aged forty-one years, she had an ectopic pregnancy, with rupture and severe shock. The peritoneal cavity was found filled with blood, the left tube was quickly ligated and removed, its end not being excised from the uterine wall. From this operation the patient made a gradual recovery. Four months later she aborted from the uterus, this occurring early in 1915. On November 20, 1920, she gave normal birth to a full term child weighing eight pounds eight ounces. As the left ovary was allowed to remain and the left tube was not excised from the uterine wall, but only ligated, the patient's subsequent conception was not surprising.

Gudden¹ reports, from the clinic in Kiel, 22 cases of repeated ectopic pregnancy. The frequency of repeated ectopic pregnancy is estimated from the literature at 5.7 per cent. In 86.4 per cent, the cause of ectopic pregnancy was an inflammatory condition of the pelvic organs.

The interval between these pregnancies varied from ten months to twelve years and seven months. During these intervals 10 patients had 19 intra-uterine pregnancies, 7 went to full term, 4 taking place in 1 patient. All of these cases had been treated by operation. Those that were infected had drainage through the vagina, the others through the abdomen. As a rule, the affected tube was removed by a wedge-shaped incision at the point of its entrance into the uterine wall. In 1 case this was not done, and fifteen months afterward the severed tube was implanted in the uterine wall.

The general mortality of ectopic pregnancy the writer believes to be 2.7 per cent; 1.2 per cent died of postoperative complications, most of them making a comparatively uninterrupted recovery. Those treated by vaginal operation recovered more slowly than those having abdominal section. One had severe hemorrhage on the twelfth day after operation. When there was evidently severe infection after abdominal section, drainage was instituted through the vagina. At a second operation, chronic pelvic peritonitis was found in some cases, and in 1 a chronic appendicitis. One patient was operated on a second time, some two or three years after the first operation. The patient had had 10 pregnancies, twins once and triplets once. On section on the left side, there was a tubal abortion, on the right a hematosalpinx. On microscopical examination of the removed tubes, there was embryonic tissue in both of them showing twin ectopic pregnancy. This the writer states was the twenty-eighth case of this sort in the literature.

The writer believes that when operation is done for tubal pregnancy the tube upon the opposite side should also be removed. His reason for this is the occurrence of repeated ectopic pregnancy and the dangers to which it exposes the mother. As to the frequency of intra-uterine pregnancy after ectopic pregnancy, the literature gives widely differing reports, statistics vary from 17 per cent to 53 per cent. In the writer's experience, 25.8 per cent of women having ectopic pregnancy,

¹ Zentralblatt für Gynäkologie, 1921, No. 41, p. 1479.

subsequently had an intra-uterine pregnancy, and 50 per cent had an ectopic pregnancy.

Woolf¹ reports a bilateral interstitial ruptured ectopic gestation. The woman had been married seven years and a year after her marriage had given birth to a child. There had been no pregnancy since, menstruation had ceased for two months and the patient was seized with sudden sharp pain in the left side of the abdomen, lessening toward evening. For the next few days she felt well except for weakness. On the fourth day she was again seized with acute abdominal pain, and fainted. Pain and vomiting had lasted until her admission to the hospital. The patient was shocked, with high pulse-rate, rigid abdomen, with tenderness, and vaginal examination revealed nothing abnormal.

At operation, there was a large quantity of dark blood in the peritoneal cavity. In the intramural portion of both Fallopian tubes there were gestation sacs which had ruptured, on the left side a large hematocoele and blood clots in the pelvis. The patient's condition was such that no time could be lost and subtotal hysterectomy was performed and uneventful recovery followed.

On examination, the specimen showed that there was an interstitial pregnancy on one side and chorionic villi on the other. A double ruptured ectopic pregnancy had been present.

RUPTURED ECTOPIC PREGNANCY. Zimmermann² draws attention to the value of treating ruptured ectopic gestation by the reinjection of blood obtained from the abdomen of the patient during the operation. He describes in detail a number of experiments on animals proving the possibility of this method of treatment and the fact that such treatment does not produce irritation of the peritoneum, and is prompt and beneficial in its results. He describes a case of placenta previa where much blood had been lost and where, on the fifth day of the puerperal period, hemorrhage returned which was of threatening character; 200 cc of defibrinated blood from a man was then injected through a trocar into the peritoneal cavity, this temporarily checked the hemorrhage, but four days later bleeding returned, with a fatal issue. He also describes a patient pulseless at time of operation, the abdomen filled with fluid blood and small clots in the pelvis; after removal of the left pregnant tube, the clots were rapidly removed and the abdomen closed. This occupied but eighteen minutes, following which between a pint and a pint and a half of fluid blood was allowed to remain in the abdomen. By percussion, it was impossible to recognize the presence of the blood as it seemed to have been completely absorbed.

Rosenstein³ in writing upon the **DIAGNOSIS AND TREATMENT OF ECTOPIC GESTATION** calls attention to the *danger of infection* where hematocoele is present. He recognizes the fact that authorities differ regarding the treatment of blood found free in the abdomen. He believes that while clots should be removed, blood recently lost from vessels into the abdomen should be allowed to remain. The direct transfusion of blood

¹ Lancet, January, 1, 1922, p. 11.

² Zeitschrift für Geburtshülfe, 1921, **84**, 335.

³ Monatsschrift für Geburtshülfe, 1921, vol. **54**.

he would reserve for a more critical case. He believes, however, that the transfusion of the patient's blood offers a valuable indication, with better prospects of success in the future.

Polak¹ has made observations to determine the SOURCE OF BLEEDING IN ECTOPIC PREGNANCY. He finds that a decidual reaction may be found at several points in the tube often far removed from the site of the ovum. When the ovum dies and is separated by hemorrhage from the decidua, there is bleeding from the uterus and from several points from decidual reaction in the tube, blood escapes into the peritoneum by tubal peristalsis and presence of clots in the tube and extravasations, blood gravitates into the cul-de-sac, thus the same causes which bring about the separation or death of the embryo produce the hemorrhage.

Polak² reports his result in the STUDY OF 307 ECTOPIC PREGNANCIES. The *treatment* universally adopted is operation, but it is of the greatest importance that proper time for operation be selected. Primary rupture is not usually serious or fatal, but 3 of his 307 cases died from primary rupture. Usually, a small vessel only is opened at first and not a main artery. After the first hemorrhage has been stopped by a clot, the patient reacts and then is the favorable time for operation. This is shown by the slower pulse and gradual increase of blood-pressure. The first treatment should be morphine freely given and after operation, if necessary, blood transfusion, when the bleeding vessel has been tied, is preferable; in severe cases it may be given during the operation. The individual vessels should be ligated to avoid interfering with the ovary. The ovary should be suspended where a tube has been removed.

Grad,³ in a group of 50 cases, has had good results with a gum-acacia-glucose solution by transfusion. This may check hemorrhage until a donor can be obtained for a blood transfusion. The gum-acacia-glucose should be given, if possible, before the patient is transferred to the hospital. While this is being done, a donor should be obtained for blood transfusion. Morphine is given, the extremities bandaged, the foot of the bed elevated, and external heat applied. When the patient is taken to the operating room, blood transfusion may be given at once. After several hundred cubic centimeters of blood have been given, anesthesia is started and operation is done as rapidly as possible, controlling the bleeding and doing nothing else. Fluid blood and clots should not be removed. The blood transfusion should continue until the abdomen is closed, 500 to 600 cc of blood is sufficient.

Chase⁴ reports an interesting case of right tubal pregnancy at four months which ruptured into the cecum, the patient treated by blood transfusion and operation, repairing the rent in the cecum communicating with the ectopic mass. As the fetus lay in the cecum, after the bowel had been repaired the ectopic mass was removed. The fourth day after operation another direct transfusion was given, with great benefit.

¹ American Journal of Obstetrics, February, 1922, p. 169.

² Ibid., September, 1921, p. 280.

³ Ibid., January, 1921, p. 360.

⁴ Ibid.

A DOUBLE TUBAL GESTATION. A double tubal gestation was reported by Borell.¹ A diagnosis had been made of ruptured right pregnant tube, but at operation both were found to be pregnant. Both tubes were excised at the uterine juncture followed by recovery. There is a considerable literature upon the subject, showing that the occurrence of double ectopic gestation is not very rare.

Rupture of the Uterus. Kreisch² describes the case of a patient, aged forty-five years, a multipara whose last child was six years of age. For two weeks she had been confined to her bed with emaciation and general prostration. The pulse was rapid and weak, and the abdomen very sensitive, and palpation negative. There was resistance over various portions of the abdomen and fluid was present. On vaginal examination, the pelvis was empty. There was pain on deep pressure and no evidence of intra-uterine pregnancy. A diagnosis was difficult, but as the patient was evidently in a miserable condition, the abdomen was opened, as it was feared that the patient had a malignant tumor. At operation, a bloody and foul fluid was found in the abdomen, an eight months child was in the abdominal cavity. The umbilical cord led near the colon and a foul and offensive placenta was present. The intestine was greatly distended and covered with purulent exudate. The uterus was the size of two fists and was removed as rapidly as possible. The abdominal cavity was irrigated with salt solution and drains inserted in the lateral wall of the abdomen. The abdominal wound was closed. There was profuse discharge from the abdominal cavity and the abdominal wound suppurated, but the patient finally made a tedious recovery. She had a rupture of the uterus which she referred to lifting a heavy wash tub about four weeks before the operation. This was followed by severe abdominal pain, and cessation of fetal movements. On examination, the specimen showed that the left side of the uterus had ruptured, through which the child had escaped.

Telfair³ reported before the New York Academy of Medicine the case of a woman, aged thirty-two years, in her fifth labor, delivered by a physician by podalic version and extração. Two hours after delivery the patient was alarmingly ill and was finally sent to the hospital. She was then in profound shock. There was deep laceration of the left side of the cervix extending upward into the lower segment. Operation was at once performed but laceration had extended into the anterior uterine wall. In spite of hysterectomy and transfusion, the patient died an hour afterward.

In discussion, Bailey alluded to 2 similar cases of incomplete tears which were treated by packing through the vagina. One had extensive tear of the broad ligament with profuse hemorrhage and recovered after a long period of fever when thrombophlebitis of both legs developed and the patient died of exhaustion.

Abruptio Placentæ. Snowden⁴ reports the case of a patient from whom had been removed the right ovary, tube and appendix. She married

¹ Zentralblatt für Gynäkologie, 1921, No. 4, p. 142.

² Monatsschrift für Geburtshilfe, 1921, 56, 34.

³ American Journal of Obstetrics, October, 1921, p. 443.

⁴ Journal of the American Medical Association, April, 16, 1921, p. 1066.

at thirty and had one abortion. In her second pregnancy she became toxemic to a marked degree, and it was determined to bring on labor. Castor oil and quinine accomplished nothing; packing the cervix tightly with gauze was also without effect. The patient became worse, and it was necessary to dilate the cervix manually, rupture the membranes and deliver the child with forceps. The infant was a male weighing ten pounds and four ounces, and was stillborn. The patient made a comparatively good recovery. During the next pregnancy she again became toxemic and was seized with severe abdominal pains, with dimness of vision. On examination, heart-beats could not be heard; the uterus was hard and very painful. On section, the placenta was found to be completely separated, with a large quantity of free blood in the uterus. A dead male child was removed and the uterus sutured. There was minute hemorrhage from many points and the patient continued to be highly toxic and made a gradual and tedious recovery.

Premature Separation of the Placenta. Frankl and Heiss¹ contribute an interesting paper upon this subject in which they quote statistics as to the frequency of this accident. The records of the First Obstetrical Clinic in Vienna contain the histories of 35,352 cases of labor excluding the termination of pregnancy before the twenty-eighth week. Among these occurred 34 cases of premature separation of the normally implanted placenta. This makes a percentage of 0.096. The records of other clinics vary greatly, from 1 in 500 cases to 17 in 200. In general, it may be stated that less than 1 per cent is an average frequency. When the age of patients is considered, between twenty-five and thirty years, cover the greatest number. Of their cases 32 per cent were primipare and 68 per cent multipare. So far as symptoms are concerned, in the 34 cases occurring in the Clinic, 16 were not of great severity and 18 were of a very dangerous type; and of these 18, 9 died. The division into mild and severe cases may be made on the extent of the placental separation.

In contrast to the statement often made that, in accidental separation of the placenta, there is little or no hemorrhage, the writers observed a considerable hemorrhage in many of their cases as soon as pains began. In 3 cases there was slight hemorrhage a day before the labor. This bleeding stopped spontaneously. In 1 case there was hemorrhage three months before the end of pregnancy. It is evident from this that bleeding without pain is not an infallible sign of placenta previa. It does, however, point to an abnormal insertion, but to some complication on the side of the placenta. There was hemorrhage before the beginning of labor in 5 cases which were especially grave. In the 9 cases where the os would admit two fingers, there was also hemorrhage, and these cases did badly. In 7 cases the placenta separated when the os would admit four fingers, and in 7, separation occurred near the end of the period of expulsion. In 6, during the entire course of labor, there was very slight hemorrhage which persisted in spite of whatever was done to terminate the labor.

¹ Archiv für Gynäkologie, 1921, 114, 225.

In considering these cases, one is accustomed to distinguish between internal and external bleeding. In 9 cases there was internal hemorrhage with little external. In 21 cases the hemorrhage was equal, whether external or internal; in 2 cases the external bleeding was far greater than the accumulation of blood behind the placenta, and in 2 cases there was internal hemorrhage alone. When, on examination, the placenta cannot be felt or can but just be reached, and the symptoms are those of separation, placenta previa can be excluded. Where the hemorrhage is entirely internal, shock and anemia are especially in evidence. In these cases the abdomen is often hard and distended; the uterus sensitive and apparently of the consistence of wood, so that it is impossible to feel the fetus on palpation. The uterus resembles a tumor in its position and consistence. If the membranes have not been ruptured, they are found tense, because the blood accumulated in the uterus increases the pressure on the membranes. The child's heart-beats cannot be heard. Where separation occurs before labor begins, the symptoms may develop suddenly and often without the patient's knowledge, as in sleep. The pulse is small, frequent, irregular; tension low. Where there is both internal and external hemorrhage, the anemia is out of proportion to the external hemorrhage. If the composition of the blood is studied, reliable ground is given for the diagnosis and also a prognosis in the case. When toxemia is well developed, it may greatly mask symptoms, especially if eclampsia or pernicious nausea is present. When placental separation is a result of violence, the accident may happen at any time during pregnancy or labor. In transverse presentation complications may develop because of the stretching of the lower uterine segment, and this is also true in cases of hydrocephalus and twin pregnancy. A typical case of hemorrhage the result of direct violence is reported in a woman between seven and eight months pregnant, who was kicked in the abdomen by a calf. Considerable hemorrhage from the vagina followed which persisted for eight days and finally ceased, after the patient had remained in bed. Labor was spontaneous at term; the child well developed and surviving. On the maternal side of the placenta at the edge there were several old and adherent clots, showing where the placenta had separated when the blow was received.

The history of another patient is given, who was at the end of her third pregnancy. The fetus was in transverse position; the os would admit three fingers, and the membranes ruptured followed by the sudden discharge of four quarts of amniotic liquid. After this came a very free and considerable hemorrhage. The child's heart sounds soon ceased to be audible. Combined version was done followed by extraction and by perforation of the after-coming head as the pelvis was contracted. Following delivery, there was a severe hemorrhage. The uterus was relaxed and contracted badly. It was necessary to remove the placenta manually. This showed but a portion of it had been actually adherent to the uterine wall, and on the maternal surface of the placenta there was a clot as large as a small plate. The writers also describe a case of hydrocephalus in a multipara in labor five days in whom the head of

the fetus was perforated, followed by its spontaneous delivery. The placenta was partly separated, and, as it was not spontaneously delivered, it was removed by the hand. On the maternal surface of the placenta there were several clots as large as an infant's fist. There had been considerable free hemorrhage in the case. The patient died two days later with a purulent endometritis. At autopsy, an incomplete laceration in the anterior wall of the uterus in the vicinity of the bladder was found. There was also peritonitis and acute edema of the brain.

He also narrates the case of a multipara with a rachitic pelvis and prolapse of the cord, who had sharp hemorrhage. The head was fixed in the entrance to the pelvis and a contraction ring had developed. An effort was made to deliver by forceps as the os was completely dilated, and a loop of pulsating cord could be felt on the left side of the pelvis. This failed and craniotomy was performed followed by a severe hemorrhage. There was no laceration, but the uterus did not contract. The patient died soon after, and autopsy revealed no wound or injury of the genital tract.

A further case was a primipara, aged eighteen years, with a small flat pelvis; the uterus was tense and increased in size. Fetal heart-sounds could not be heard, and the child's head was perforated. Without the brain, it weighed 3900 grams. Immediately after delivery there was a very free hemorrhage of fresh and old blood. The placenta was at the fundus and had to be delivered manually. Three-fourths of the external aspect of the placenta was covered with coagula. There was no albumin in the urine.

Of the 34 cases, not less than 19 had albuminuria, and, of these, 6 had severe toxemia of pregnancy. Among these were 3 primiparæ. In some of the cases there was evidence of complications in the brain and liver. In some of the cases of toxemia which died, free blood was found in the abdominal cavity. Thirteen cases had albumin in the urine without eclampsia, and, of these, 11 seemed to have the typical kidney of pregnancy, and 2 of these were found at autopsy to have contracted kidney. In 1 of these cases, a multipara, aged twenty-five years, the uterus was found at autopsy greatly dilated, relaxed, and suffused with blood. There was a half pint of blood in the abdominal cavity. There was also fatty degeneration of the heart muscle, kidneys, liver and spleen. The question naturally arises as to how blood makes its way into the abdominal cavity? In some cases there are lacerations of the uterine muscle and peritoneum, through which blood may escape, and in the 2 cases mentioned, such were not present. It is undoubtedly true, if there is a considerable intra-uterine pressure, that blood may be forced through the tubes into the cavity of the peritoneum. The extravasations of blood, sometimes seen in the broad ligaments, have nothing to do with these cases. He further describes the case of a multipara, aged twenty-eight years, who had had difficult pregnancies and labors including eclampsia and hemorrhage. A midwife was summoned because, after some indefinite pains, a sudden and profuse hemorrhage occurred. On admission to the hospital, the urine showed extensive degeneration of the kidneys; heart-sounds could not be heard,

and the head was presenting at the pelvic brim. The uterus was slowly enlarging, and there were evidences of separation of the placenta. Accordingly, the membranes were ruptured, version performed and the child was extracted, followed by a large mass of blood and coagula. The placenta was found very largely separated. The tear in the cervix was closed, but hemorrhage from the uterus continued, and the patient died. At autopsy, there was extensive parenchymatous degeneration of the vital organs. The writer also describes the case of a primipara in whom symptoms suggested threatened eclampsia or separation of the placenta. As the uterus continued to enlarge in size, an attempt was made to perform version, which failed. Craniotomy was then done and the uterus emptied, a large quantity of clotted blood being discharged. After a severe illness, the patient recovered.

In considering the *cause* of this accident, various theories are discussed and attention is drawn to the universal opinion that albuminuria is present in these cases. Later pathologists believe that the toxemia of pregnancy is the essential element. The writers examined the placenta in their patients and found the essential element to be hemorrhage into the decidua with the formation of blood clot which gradually separated the placenta; the uterine decidua seemed to be practically normal. While there seemed to be no alteration in the cells of the fetal or maternal decidua, these tissues were thoroughly infiltrated with blood. In four cases the uterine muscle was extensively distended by extravasated blood. The pressure of the extravasated blood through the muscular substance had much to do with the separation of the placenta. The exact mechanism of separation cannot be clearly made out by the study of the anatomy of the placenta or uterus alone. The toxic condition of the mother's blood is the essential element in these cases. There is evidently an alteration in the small bloodvessels which favors the extravasation of blood so freely. Such changes are known to occur in the vessels of the kidney in the presence of degenerative diseases. Increased blood pressure in pregnancy, hemorrhages in various parts of the body; lesions described as apoplexy of the placenta; and changes in the uterine wall, all make a pathological picture which explains the clinical course of these cases. If the causes of placental separation are to be summarized, we must recognize mechanical causes, such as shortness of the umbilical cord, prolonged labor and mechanical violence, a premature dilatation of the bloodvessels in the spongy layer of the decidua and the rupture of the septa between these vessels. This occurs in cases of hydramnion, twin pregnancy, accidents with great violence, and diseases affecting the circulation. There are also many cases where an altered condition of the bloodvessels is the important element of the cause. Such patients have nephritis and toxemia. Many patients show a combination of these various causes.

In the matter of *diagnosis*, there is ordinarily little difficulty. The anemia, symptoms of shock, quality of the pulse, abdominal tension, painful condition of the uterus, inability to palpate the child and to hear its heart-sounds; and the relatively slight external bleeding, with

symptoms of toxemia, should make a diagnosis comparatively plain. When the only symptom is concealed hemorrhage, the diagnosis may be more difficult. Here one must distinguish between ruptured uterus, ruptured ectopic pregnancy, and, in rare cases, rupture in ovarian cysts with twisted pedicle. Where the uterus ruptures the child can be felt with unusual plainness, and abdominal pregnancy might be difficult to recognize. Where there is external hemorrhage, one must distinguish between separation of a normally implanted placenta and hemorrhage from placenta previa. It may be very difficult to distinguish between abdominal pregnancy and accidental separation of the placenta. It would be possible to recognize free blood in the abdominal cavity under both conditions. An external hemorrhage, such as usually occurs when an abdominal pregnancy ruptures, would indicate an extra-uterine pregnancy.

So far as treatment of the 34 cases is concerned, 16 of them are classed as unimportant, and 18 as critical. Among the cases not in a dangerous condition, 9 ended spontaneously. In 4, version was performed with bringing down a foot, and extraction followed. In 1 case only, the rupture of the membranes was sufficient because dilatation was complete. Of these cases, 13 children lived, of whom 1 died two days after birth. All of the 16 mothers lived, but 2 had fever during the puerperal period. One case developed mental disease following delivery, and 1 case became toxic a short time after the termination of pregnancy.

In the 18 cases which were in a critical condition, 1 was delivered of a macerated child following a severe hemorrhage two days before labor. In 2, the membranes were artificially ruptured, 4 had version and extraction; 3 of them craniotomy on the after-coming head. Four had perforation of the presenting head as a means of delivery. One of the cases has a hydrocephalus. There were 7 cases of vaginal Cesarean section; in 3 of them perforation of the head. One had a transverse position and decapitation. In this series there were 18 children still-born; 9 of the mothers died, and 3 of those who survived had fever in the puerperal period. Among those who died, 3 perished from exhaustion; 4 were toxic and it could not be determined whether death resulted from the separation of the placenta or from the toxic condition.

The writer believes that in attempting to select a mode of treatment, one must have special reference to the cause underlying the accident. The quantity and character of the hemorrhage is also of importance; if this is slight, no interference need be practised. While in placenta previa it is possible to make pressure against the placenta in some manner, such cannot be done when the placenta is normally situated but separated. The use of the dilating bag is not in many cases advisable. When the placenta is lateral and partially separated, it is comparatively simple to rupture the membranes and stimulate uterine contraction. The use of pituitrin is not advisable; and many cases are not suitable for version or the application of forceps. Craniotomy is indicated in many. The majority of obstetricians incline to abdominal Cesarean section in cases of separation of the normally implanted placenta.

Diseases of the Kidneys Complicating Pregnancy. von Jaschke¹ believes that there has been confusion in the terms applied to the condition of the kidneys during pregnancy. He would apply the name nephrosis of pregnancy to a condition characterized by marked edema, abundant albumin in the urine, many casts without blood, increased blood-pressure and hypertrophy of the heart. This condition will usually yield to a diet without salt, rest in bed, increasing the secretion of urine by digitalis, and, in suitable cases, the termination of pregnancy. Other cases, however, where the typical condition is mixed with others, are often seen, and in these blood is frequently found in the urine. The kidney of pregnancy may also be combined with glomerulo-nephritis. In these there is increased blood pressure, blood in the urine and evidences of a process of degeneration. Many of these cases terminate in eclampsia and during the puerperal period the patient's recovery is delayed. The writer also recognizes a combination of sclerosis of the kidneys with the so-called kidney of pregnancy.

Fatal Poisoning with Salvarsan in Pregnancy. Lorenzen² reports the case of a primipara with positive Wassermann reaction admitted to the hospital pregnant, to whom 3.0 g of salvarsan was in all given by injection. On admission, the skin of the body on the extremities was very red, moist in places, in other places raised in welts. There was eczema of the scalp and moderate conjunctivitis. The patient's temperature rose to 103.5° F.; labor developed, with the face of the mother much swollen, the skin eczematous with deep fissures and depressions; the margins of the eyelids coated with secretion; the tongue furred and coated, severe conjunctivitis. Both lower extremities were edematous; the skin of the body and of the extremities was very red. The labia were edematous and the skin over them was smooth and shiny. The entrance to the vagina was greatly narrowed by swelling so that an internal examination could not be made. After nine hours of labor a living male child was born spontaneously, a median episiotomy being made. The placenta was spontaneously expelled one-quarter of an hour after the birth of the child; the uterus contracted well; there was little hemorrhage. The patient had fever at evening; the abdomen became distended and the patient seemed very ill. On the next day the condition was much the same, an ulcer appeared at the vaginal entrance covered with foul secretion. Vulvitis developed; the uterus remained well contracted and without tenderness. On the following day the ulcerated surfaces on the labia had increased in size; there was necrosis in the deeper tissues and a copious secretion of pus. On the following day the patient was still worse and on the tenth day after delivery the patient had a severe bleeding from the vagina and on the next a fatal result.

At autopsy, there was a very active and virulent dermatitis. There were spots of ulceration on the external genitals and from the skin lesions a general infection, with swelling of the spleen, but without softening. The symptoms were those of general thrombosis with

¹ Archiv für Gynäkologie, 1921, 114, 255.

² Zentralblatt für Gynäkologie, October, 1921, p. 1407.

hypostatic pneumonia; cloudy swelling of the liver and kidneys. There were septic lesions in the intestines. The whole picture was that of a fatal general septic infection in the puerperal period. The salvarsan was certainly the indirect cause for the fatal issue. Pregnant patients evidently differ in their reaction to salvarsan, but it must be remembered that the lesions produced by labor may lessen the power of resistance on the part of the patient, and thus bring about the fatal issue.

The Prevention of Stillbirth. Browne¹ draws attention to the fact that a large percentage of stillbirths could be prevented by adequate treatment during pregnancy. Many of the severest complications of labor calling for craniotomy and producing asphyxia or cerebral hemorrhage in the new born could be prevented. In these cases the child is often especially large and well developed, and the loss of such an infant is to be regretted. The early recognition of syphilis and its appropriate treatment would also result in a very substantial saving of life. The plea is made for a more thorough examination of pregnant patients and for the free use of those agencies which brings about this result.

The Sequelæ of the Toxic Albuminurias of Pregnancy. Gibson² reports 30 cases of pregnancy in whom albumin and casts were present in the urine, and who could be said to have the toxic albuminuria of pregnancy. At the time of writing, 27 of the 30 cases survived, and there were 7 with a subsequent pregnancy, which is thought to be a fair percentage in view of the character of the first pregnancy. In 5 of these the subsequent pregnancy had terminated, and, of these, 4 were discharged from the hospital after the first pregnancy without casts and albumin and with a normal arterial tension. In the second pregnancy the 7 were under careful observation by reason of their previous history. One of these 7 had premature separation of the placenta at six months, and another premature delivery with hydramnion; 1 a moderately severe albuminuria with some hypertension; 1 operative delivery, indicated by rapidly increasing tension and albuminuria, in whom the symptoms of a dangerous condition developed very rapidly. One patient had eclampsia who had weekly examination at the prenatal clinic; she was admitted at seven and a half months—with a pulse tension of 186-90—for the termination of pregnancy; labor, however, developed spontaneously. At the time of writing there were 2 remaining undelivered. One in the fourth month of her second pregnancy with a tension of 148-88 with no albumin or casts; and 1, a previous eclamptic, in the fifth month of the second pregnancy, with a tension of 152-84, but without casts or albumin. Between the first and second pregnancies none of these women with the exception of 1, a chronic nephritic, gave symptoms suggestive of chronic nephritis, nor was there evidence of cardiac disease.

The writer believes that freedom from albumin with a normal arterial function following a toxic albuminuria in the course of one pregnancy by no means indicates that the patient will escape danger subsequently. If the question is asked whether a patient who has once had toxemia in

¹ *Lancet*, November 12, 1921, p. 1018.

² *Surgery, Gynecology and Obstetrics*, June, 1921, p. 513.

pregnancy should take this risk again, a physician may reply that if the patient has had a normal arterial tension with no evidences of disease of the kidneys for some time and is willing to assume a moderate risk, that a subsequent pregnancy may be undertaken. The writer believes that the subject is so obscure that one should not urge a patient to undertake this risk.

Superfetation or Superfecundation. Radasch¹ describes a specimen sent to him for histological examination of a double pregnancy, supposed to be twin. On examination, the two fetuses were of such greatly different sizes and stages of development as to lead to the conclusion that the specimen represented a case of superfetation.

Radasch reviews the literature on the subject which is extensive, and from which writers upon the subject have failed to reach a positive conclusion. His review of the literature is interesting and valuable for those who desire to study the subject. The study of his specimen shows that the smaller fetus represented an ovum that was fertilized nine or ten weeks after the larger. This conclusion is based upon the difference in developmental stages and the fact that unquestionably there were two distinctly separate original sacs and this could not be twin pregnancy because of the difference between development of the two fetuses and because of the layer of tissue between the apparently fused sacs. On minute examination it was found that this fusion was only apparent and due to pressure, and that the only real fusion occurred at the placental area. Those who deny the possibility of superfetation base their argument on the statement that ovulation ceases during pregnancy. The writer asserts that no young fetus could exist dead for two or more months without showing well-marked signs of decomposition and maceration. The fact that these cases have been rarely demonstrated does not prove that they cannot occur.

The writer denies that ovulation invariably ceases during pregnancy, and there is every reason to believe that in this contention he is correct, not only does the study of the human being support his arguments, but they receive abundant confirmation in the study of other warm blooded beings. After an interval of three months the occurrence of superfetation is doubtful and highly improbable.

This paper is concluded by a bibliography of thirty-three references and must be taken as a valuable contribution to the subject; obviously medicolegal questions may arise of great importance and difficult of solution and the firm establishment of superfetation on a basis of scientific demonstration is exceedingly valuable in this as well as in other cases.

Abortion.—THE MANAGEMENT OF CASES OF ABORTION IN WHOM FEVER DEVELOPS. Haberer² describes his researches in cases of abortion where fever had developed. He endeavored to ascertain what part in the elevation of temperature is taken by bacteria. For this purpose he made cultures of the patients' blood, also from material

¹ Surgery, Gynecology and Obstetrics, April, 1921, p. 339.

² Zentralblatt für Gynäkologie, 1921, No. 24, p. 859.

taken from the uterus and examined bacteriologically the placenta. He was enabled to do this in fifty patients.

We have frequently been disappointed in the practical results of bacteriological examinations in septic conditions complicating parturition. Even the presence of a given germ may not have the same significance in different cases, for so much depends upon the general condition and resisting power of the individual patient. Experience shows that one can place better dependence on the clinical signs and symptoms accurately observed and carefully recorded. Of those patients who had fever, 84 per cent were subjected to operation for the thorough exploration and evacuation of the cavity of the uterus. These patients number 42, and the operation was done within forty-eight hours after the uterus had expelled its contents. The results were excellent; the temperature dropping; the patients making a quick recovery and leaving the hospital within ten days practically convalescent.

It is most important and significant to find that after the writer has made these bacteriological examinations with the utmost accuracy and precautions that he is unable to select a given course of treatment from the bacteriological test made in a given case. He declares that, so far as treatment is concerned, he will decide upon this from clinical signs and symptoms only, and he lays great stress upon a very thorough and careful vaginal examination with bimanual palpation. His experience has convinced him that when he is called to a case of abortion complicated by fever, that the best result is obtained by thoroughly exploring and emptying the uterus as soon as possible.

Another form of treatment for abortion complicated by fever is described by Hellendall.¹ Recalling the experience of army surgeons in their employment of Dakin's solution for infected wounds, he has applied this method to obstetrical and gynecological patients. He had 6 patients with abortion and fever, and as the first step of the treatment irrigated the uterus with from one to three quarts of 0.5 per cent Dobert's solution, thus washing away septic material which had been retained. The result of this was a rapid falling in temperature. In another case where a patient had a pregnancy terminated at the fifth month followed by hemorrhage and infection of the tissues about the uterus, the uterus was explored and emptied and irrigation practised as stated. This patient had been infected by a midwife—who, when the placenta was not naturally delivered—tried to remove it. This patient did so well after the irrigation that she was considered practically out of danger in three days. In an abortion at three months pregnancy, the patient's condition was complicated by the fact that the placenta had not been delivered. Infection had developed with very foul lochia. In this case Dobert's solution in quantities of two quarts was employed to irrigate the uterus, and this was followed by a prompt fall of the fever. Six cases of abortion following fetal death at the sixth month were also among his material. The membranes were still unbroken in some, while in others the amniotic liquid had escaped. The cervix was

¹ Zentralblatt für Gynäkologie, 1921, No. 23, p. 867.

closed in some of these patients, and more or less dilated in others. In some, a high temperature and chills had developed, and others had fever, but had not developed chills. In treating these cases, 0.5 per cent Dobert's solution was used with very copious irrigation. On the evening of the day when the treatment was given to 2 patients, they had chills and high fever. These symptoms, however disappeared and recovery followed. In others, the remedy was used in the manner described without complications.

One patient was admitted to the hospital who had fever during the birth of the child. There had been premature rupture of the membranes three days before. The doctor in attendance believed that delivery by abdominal operation was needed, because the patient's labor had been in progress for a day and night. She had been attended by a midwife, who made repeated vaginal manipulations. In addition to this, the doctor in charge of the case had tried forceps. On admission, the pulse was 124, temperature 102.5° F.; the pelvis was contracted with a true conjugate of 7.5 cm., and there was no engagement of the presenting part, which was freely movable. There was two-thirds dilatation of the cervix. An effort was made to bring about vaginal delivery during the next ten hours. Pituitrin was used three times followed by an increase in the dilatation of the cervix and the fixation of the fetal head in the brim of the pelvis. Forceps was then applied at the pelvic brim and episiotomy was done, and the operator was successful in delivering a living child. The contents of the uterus were excessively foul in odor, and copious irrigation with Dobert's solution was practised after delivery. A temperature of 102° F. developed for the first four days following labor with very foul lochia, and pulse of 120 followed by gradual, but complete, recovery.

ABDOMINAL ABORTION. Obstetricians not infrequently encounter cases in which pregnancy must end and where there are complications which suggest sterilization. In some of these patients, there are general conditions rendering inhalation anesthesia very dangerous. Newell¹ publishes his experience with the management of cases having these complications. It is not uncommon to find pregnant patients with heart lesions so serious as to forbid inhalation anesthesia, because of failure of compensation. Others have chronic processes in the kidneys which are clearly going on; and many of these patients have had their pregnancies terminated by the delivery of still-born children. While some of these patients had had little care, others had received every medical attention. Among these the writer would place pregnant women, suffering from tubercular infection of the lungs, who, earlier in life, had given birth to children and in whom at the time of examination the tubercular process was inactive. Cases of diabetes which are doing badly come under this description. One of the most common varieties of cases requiring such management are patients with heart lesions, in whom compensation is failing. Most of these cannot be safely treated by inhalation anesthesia. The injection of narcotics into the spinal

¹ American Journal of Obstetrics, December, 1921, p. 606.

canal produces such violent disturbance in the circulation and in pulse tension that the writer declines this method. In weak patients its use might be exceedingly hazardous. The interest of the patient forbids paravertebral injections, because this method is tedious and causes prostration in the patient. The writer prefers preliminary treatment by hypodermatic injections of morphine and scopolamine followed by infiltration of the tissues with 0.5 per cent novocain, the whole preceding delivery by Cesarean section, if possible at term. In a few patients the abdominal wound made through the infiltrated tissue has been tardy in healing in cases where the patient was not in good general condition at the time of operation and where extensive infiltration was necessary. In applying this method of treatment, absolute quiet is indispensable. It is worse than useless to question the patient concerning pain, and in the operating room at the time of operation conversation should be forbidden. Many cases of early pregnancy are seen in which it would be desirable to employ this method. When, however, the uterus and pelvic peritoneum are pulled upon or disturbed, so much pain is caused that the operation cannot proceed. It is, however, very difficult to deliver a small uterus out of the pelvis without pulling so strongly on the uterine attachments as to interfere with the operation. The uterus must be brought so high in the abdomen that considerable tension is inevitable. If a patient becomes restless and complains of great pain during such an operation, general anesthesia must be substituted. In young women it is best to secure sterilization by removing the Fallopian tubes, rather than by extirpating the uterus or performing hysterectomy. If this procedure is to be successful, the treatment must be carried out in a definite way, thoroughly, and before the actual operation.

In the writer's experience, the best results are obtained when the patient is given, two and a half hours before operation, morphine ($\frac{1}{6}$ gr.) scopolamine ($\frac{1}{200}$ gr.) hypodermatically. At intervals of forty minutes scopolamine ($\frac{1}{200}$ gr.) is given by hypodermatic injection three or four times, and very rarely is this quantity exceeded. To prevent disturbance, the patient's ears are filled with cotton and her eyes are bandaged. Lifting and handling the patient and transferring her from her room to the operating room are all done silently and as quietly as possible. Preparation is as simple as it can be and as promptly performed. The field of operation is painted with iodine, and 0.5 per cent novocain injected where it is proposed to make the incision. If the morphine and scopolamine have put the patient to sleep before infiltration is begun, it is necessary to wait not more than five minutes before making the incision. If the patient is restless, the operator must delay ten minutes or more. The opening of the abdominal cavity is performed by the usual suprapubic incision, and in early pregnancy it is necessary to use considerable traction in bringing the uterus to a point where it can be opened. This manipulation may produce disturbance, and it may be necessary to infiltrate the broad ligaments and tissues about the uterus separately and repeatedly. In favorable cases the writer has been able to incise the uterus, empty it by the finger, and close the incisions with very little suffering and disturbance. If it is

proposed to perform salpingectomy, the separate infiltration must be given on the inner side of the broad ligaments throughout their extent, and especially where the tube enters the uterine wall. Old adhesions are always a complication, and such must often be separately infiltrated, ligated, and sewed. From the writer's account, it is evident that he would not attempt to extirpate the uterus with local anesthesia, because of the necessary traction on the tissues of the peritoneum, and manipulation. After these operations, the majority of patients stated that they had felt no discomfort. At the moment of operation patients complained who afterward denied suffering. There was no vomiting following this treatment. In the writer's mind, this method marks a great gain over our previous management of those patients who have some definite condition forbidding pregnancy and who consent to sterilization. Compared with other methods, hemorrhage and prostration are less than when pregnancy is terminated through the vagina, and there is the great additional advantage that impregnation cannot occur. It is stated that competent, general, inhalation anesthesia is not to be substituted by this local method, but where this cannot be carried out the local method has proven successful.

The Active or Expectant Treatment of Abortion with Fever. The discussion as to which is safer, the active or expectant treatment of abortion with fever, receives a contribution from Offermann.¹ His material embraced 74 cases with accurate histories, careful observation and bacteriological examination. It was reckoned an abortion if pregnancy was interrupted up to the sixth month and fever was considered a rise of temperature above 38° C. The drugs used in these cases were quinine and pituglandol. These drugs seemed to produce a favorable effect and in many cases rendered curetting of the uterus unnecessary. The writer believes that these drugs have been used too little by those who treat these cases. The patients were treated by skilled persons alone, and if the uterus was to be dilated, it was done with laminaria tents or solid dilators. Among the 74 cases were 24 complicated by various degrees of infection. Among these the mortality was 8 per cent. A case was considered complicated if infection had completely involved the endometrium and had penetrated to the muscular substance of the uterus. There were 10 cases which were complicated from the very first, leaving 64 which were available for this study. Among these, complications were present in 21 per cent, and the mortality was 4.6 per cent. Of these, there were 46 which were not actively treated, with a percentage of 8.6 of complicated cases and a mortality of 2.1 per cent among this number. Eighteen cases were treated by active interference with 55 per cent of complications, and a mortality of 11 per cent. It is interesting to know what was the course of cases complicated by streptococcus infection. Of these cases 53 per cent had complications, with a mortality of 6.6 per cent, while the cases that had no streptococci had 16 per cent complications and 4 per cent mortality. In cases infected by the streptococcus where expectant treat-

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, 1921, vol. 55.

ment was carried out, there was 45 per cent of complications and 9 per cent mortality. Where interference was undertaken there were 74 per cent of complications and no mortality. It would seem as if active treatment in these cases was followed by only 50 per cent complications and no mortality. The number of cases, however, is too small from which to draw a definite conclusion.

Criminal abortion is commonly thought to have a higher rate of mortality and morbidity than other varieties. Where interference is practised in the treatment of a case of criminal abortion, all of these patients show complications; while active treatment in those patients who have not had criminal abortion shows only 50 per cent complications. This would indicate that cases of criminal abortion should not be interfered with. It is often difficult to know positively whether a given case is one of criminal abortion, because every effort at concealment is made in these cases. A case is described in which a patient came to the clinic with the history of abortion, and in which the uterus was emptied by the introduction of the finger. The patient subsequently died, and autopsy showed a small point in the cervix, through which the sound or needle of the criminal abortionist had punctured the uterus. During the life of the patient this could not be detected. It is also observed where interference is practised that fever lasted a shorter time in the percentage of almost two to one. The average duration of illness in these cases was twenty-nine days where interference was practised; where it was not the duration was twenty-two days. The duration of treatment was respectively nineteen and fourteen days.

The writer concludes by stating that in every case of abortion complicated by fever, an effort should be made to cause the uterus to contract and expel any retained matter by the use of drugs. In many cases this effort is successful. When it is not, interference is practised first five days after fever has ceased and practically after streptococci have not been found in the vaginal secretion. In this treatment there has very rarely been seen sudden and severe bleeding, and the necessity for immediate interference has very seldom arisen. Under this plan of treatment, he has seen no severe lesions or sudden death through hemorrhage.

A further contribution to this discussion is made by Vanverts.¹ He reviews 256 cases, of which 200 were treated by operation; 56 without. The latter were cases of abortion without complications. The other 200 showed hemorrhage, infection with retention as a reason for interference.

Hemorrhage indicates operation only when very abundant. It is the only reliable method of treatment in this condition, and is safe if properly done. In 82 cases in which curetting was done for hemorrhage, there was but 1 death, and that is ascribed to delay in interference. There were 99 cases where the uterus was emptied by the use of the finger or the curette, with 93 recoveries and 6 deaths. The mortality was higher where part of the embryo was retained, and where an entire

¹ *Rev. Franc. de Gynéc. et d'Obstét.*, 1920, **15**, 361.

embryo had not been discharged. Although these 99 patients were treated by emptying the uterus, in 19 the infection did not immediately stop; 4 had pelvic abscesses; 2, a general fatal peritonitis; in 1 case there was embolism; in 1 phlegmasia, and diffuse general erysipelas developed in 11. These patients were treated by the injection of turpentine, with 6 recoveries and 4 deaths. The simple emptying of the uterus failed to check the progress of disease in one-fifth of the patients. It is, however, unjust to conclude that because the uterus is emptied that this procedure may be the cause of complications, really produced by septic infection, which was present before the operation. It is not enough in some of these cases to empty the uterus only. Some require drainage of the uterus and occasionally hysterectomy.

The writer believes that unless the uterus emptied itself spontaneously in twenty-four hours, it should be emptied by interference. The writer had no complications and uninterrupted recovery in a series of 9 patients so treated. To this it is often objected that the uterus may be perforated. In 3 patients hysterectomy was done for this complication, followed by recovery.

The reviewer believes that the question—as to whether cases of abortion complicated by fever should be let alone entirely or some interference practised—depends very largely on what is done and how it is done. In cases of incomplete abortion the cervix is usually partly open, and, if not, is very easily dilated. The finger is often not long enough to explore the interior of the uterus, and hence a blunt-ended, large curette may be employed. If this is carried over the inner surface of the uterus gently but thoroughly, necrotic material ready to be discharged can easily be delivered. If the uterus is soft, fluid should not be introduced within its cavity. Iodoform gauze or plain sterile gauze, dipped in iodine and alcohol, may be used to advantage in packing the empty uterus. The uterus should be placed in its normal position and a moderate packing of sterile or antiseptic gauze should be placed in the vagina. This operation requires surgical anesthesia during which the operator can examine the pelvic tissues to advantage. It is well to prepare the patient's abdomen so that if indications are found, during the anesthesia, for opening the abdomen, this can readily be done. This necessity does not often arise. The reviewer does not think it wise to use sharp-edged and small curettes in a uterus septic after abortion. Such cause too much danger of perforation, of wounds and spreading infection.

There can be no question concerning the value of those drugs which produce a tonic contraction of the uterine muscle. Most valuable are strychnine and ergot in moderate doses. Nutrition and elimination are most important in these patients, with fresh air and good nursing. A radical operation should be undertaken in the experience of the reviewer for drainage only. Hysterectomy is very rarely indicated, but drainage by pelvic incision, or through and through drainage after opening the abdomen, sometimes does good. If pyosalpinx or appendicitis complicates the case, the pus tube or infected appendix must be removed.

It would be a mistake to interfere in no case and also an error to practise hasty and unskilled interference in any case. A treatment selected for each individual patient in accordance with the conditions present is undoubtedly safest.

THE RELATION OF ABORTION TO FULL TERM LABOR. Nebel¹ draws attention to the great increase in the percentage of abortions as compared to the number of labors at term. The older estimates gave 1 abortion to 8 or 10 full term labors; other, 1 abortion to 6 to 5, the highest estimate being that of Ahlfeld 1 abortion to 4.5 labors. It has always been difficult to ascertain the frequency of uncomplicated abortion, because an early ovum may be suddenly expelled entire, and the patient may decide that she is suffering only from a delayed menstrual period. Such a case would never be reported as an abortion. If the question is raised at what period of gestation abortion is most common, the second and third months seem to be the most usual time. Women who have had children seem to abort more frequently than those who have not, and as the woman's age advances so does the frequency of abortion. An effort was made by the writer to study the question from statistics to determine the percentage of abortions in the married or unmarried, and of abortions having fever or being free from fever. Hospital statistics for ten years were studied in the solution of these questions. In the case of the unmarried, it was almost impossible to get accurate information, because cases of abortion are reported to the authorities under other names. The statistics of European cities during the last few years show in some instances 50 per cent of abortions to labors at term. In others, the percentage falls to 15, while criminal abortion rises to 17 per cent. In Berlin, it is stated that 89 per cent of pregnancies terminated in abortion during the years of war, while in Freiburg the percentage was as low as 7. In the ten years from 1910 to 1920 there has evidently been a distinct increase in the number of abortions; the number being greatest during 1920. The highest figure reaches 26.03 per cent of pregnancy as ending in abortion. There was an increase in those cases complicated by fever from 6.66 per cent to 23.91 per cent. The mortality rate varied greatly in different cities at different times. Among unmarried women the percentage of abortion increased four fold, and among the married five or six time as many as formerly. At the present time many cases of criminal abortion escape infection and fever, so that it is not fair to conclude, because a case of abortion proceeds without fever, that criminal interference has not been practised. It was also observed that cases where injury had been done to the fetus or the genital tract of the mother during abortion were exceedingly rare. The mortality of abortion among the married and unmarried was seen to have very considerably decreased.

Another factor which complicates such an investigation is the fact that some physicians will produce a therapeutic abortion upon insufficient indications. The former custom that consultation must be held before pregnancy is artificially terminated has fallen into neglect. In

¹ Zentralblatt für Gynäkologie, 1921, No. 46, p. 1657.

ten years there were sent into the hospital 98 cases of abortion artificially produced by physicians. The critical examination of these patients showed that in 57 there was a sufficient reason for the interruption of pregnancy, and this was subsequently done; while in 41 cases the recommendation of the physician, that abortion be produced, was disregarded. There seems to be a tendency to lessen the production of artificial abortion, although the following indications are recognized.

The indications upon which operation is actually done are pulmonary tuberculosis, pronounced and in the latter stages, tuberculosis of the larynx, chronic disease of the heart with compensation failing, cases of diseases of the heart and lungs complicated by pathological conditions in the kidneys, pernicious nausea and vomiting of pregnancy—in 1 case complicated by diabetes—chronic nephritis with albuminuric retinitis, severe epilepsy, cerebral apoplexy; 1 with cerebral tumor; 1 in whom the genital tract was partly closed by scar tissue and also contracted pelvis. In 41 cases where the induction of abortion was declined, there were 13 with pulmonary tuberculosis in the first stage of the disease without fever; 3 cases of heart disease where compensation was perfect; 15 of nausea and vomiting of pregnancy which recovered; 1 isolated; 4 patients having chronic nephritis; 1 with pyelitis; 4 suffering from hysteria, and 1 with pain in the stomach following an operation for gastric ulcer. Concerning the situation in Berlin, Hirsch writes that there has been a great increase in the production of abortion, and for no good and sufficient cause threatening the life of the mother and continuation of pregnancy.

MISSED ABORTION. Rongy and Arluck¹ contribute a paper upon this subject. The definition of the condition has varied with different writers upon the subject. It seems fair to conclude that at the present time missed abortion may be described as death in the uterus of the product of conception with its complete retention and absence of progressive enlargement of the uterus, and this condition must be verified by repeated examinations for eight or ten weeks.

There may be various causes for this condition, and at present there is a tendency to believe that the glands of internal secretion are concerned in the condition. A case is narrated of a woman married seven years who had frequent abortions. While in the pregnant condition there were some signs of abortion; she was given lutein extract by injection, followed by the cessation of bleeding. The patient then went on to the fifth month when pain and hemorrhage threatened another abortion. Lutein extract was injected every other day for one week, and the hemorrhage ceased. These injections were continued at intervals of one week until the seventh month. The subsequent history of the patient is that the labor went to term and that the patient was delivered of a male child.

The causes of abortion, the writers divide into three classes. In the first are those cases where there is evidently some disturbance at the site of the attachment of the placenta. This produces greater or less

¹ Surgery, Gynecology and Obstetrics, February, 1921, p. 171.

separation of the placenta from the body of the uterus. The product of conception becomes then a foreign body and is soon expelled. The second class of cases proceed more slowly. Examination of the placenta with these patients demonstrates the presence of many small hemorrhagic infarcts. There are also evidences of calcification and necrosis. The fetus is usually macerated. With these patients the changes occurring at the placental site are slow and insidious, and pregnancy does not terminate until the greater portion of the placenta has become diseased.

In the third class it is impossible to actually study the course of the phenomenon. It is probable that pregnancy is interrupted, because some disease destroys the life of the product of conception, but this develops very slowly and the product of conception does not really become a foreign body until the placental site is completely disorganized. Some time then elapses between the death of the fetus and its expulsion. These cases are, properly speaking, missed abortion, in which death primarily takes place in the fetus because of tuberculosis or syphilis in the mother, or because of some pathological condition in the fetus, or some complication on the side of the umbilical cord.

In diagnosis, missed abortion is most commonly confused with fibroid of the uterus. If the patient be closely questioned, some of the important symptoms of pregnancy, if such has been present, can usually be found.

As regards the treatment of this condition, no rule applies to all cases. When the pregnancy is eight weeks or less, dilatation and curetting may be practised. After eight weeks a catheter may be introduced into the uterus and the cervix tightly packed. Interference with the interior of the uterus must be very carefully done in missed abortion, because the embryo and its appendages are adherent and because the uterine wall is thin and easily perforated. Where the cervix is long, thick and conical the patient should be anesthetized, the cervix dilated and a small rubber catheter introduced into the uterus and the cervix tightly packed with gauze. If the cervix is soft and partly dilated, this may be done without anesthesia. Usually within forty-eight hours the uterus contracts, if not, the treatment is repeated. A small dose of pituitrin is sometimes useful. Where there is some condition present which lessens the irritability of the uterus, the introduction of the catheter may be repeated until a result is produced. Usually the contents of the uterus is expelled entire, but if it be retained in the lower uterine segment, it can readily be removed by placental forceps and the uterus packed with gauze. The writers report the results of 21 cases, and they are distinctly in favor of interference in the manner described with these patients. They report in detail 5 cases. In 1, the patient in early pregnancy who had suffered from disturbances of the stomach, grew much better following the death of the embryo. The patient declined interference and suffered from repeated attacks of pain. When permission was finally obtained, it was difficult to empty the uterus because the embryo was adherent and the patient suffered somewhat from shock. She made a tedious recovery. In another patient a pregnancy had

ceased to grow at about the third month, and a diagnosis of fibroid of the uterus had been three times made. In this case abdominal hysterotomy was performed and the calcified fetus of about three months, closely adherent to the uterine wall, with an adherent placenta, was removed. The uterine wall at some points was greatly thinned. Gauze packing was employed and the uterine wound closed; the patient making a good recovery. In the third case abdominal hysterectomy was performed, and at the patient's request an effort at sterilization was made by ligating both tubes with silk and cutting between the ligatures. The fetus was removed through the uterine wall. Five months later this patient became again pregnant and aborted at ten weeks. His fourth case was one of a primipara with a uterus about five months in size, which had ceased to grow. When the uterus was emptied a dead fetus, with hard placenta, was expelled. Another patient supposed herself pregnant seven months, but the size of the uterus indicated four months. Her uterus was emptied of a macerated fetus.

AN UNUSUAL RESULT FOLLOWING A CRIMINAL ABORTION. Kosminski¹ reports an interesting and unusual condition following criminal abortion. The patient was aged twenty-two years, and to bring on menstruation, which had ceased, took several douches of very hot soap-suds mixture, introducing a rubber tube as far as possible into the vagina; this was followed by pain. Two days afterward a red discharge occurred, which increased, as did the pain. The hemorrhage and pain continued and an embryo was expelled. When a physician was summoned, he found a mass of decomposed blood clot in the vagina, and on the posterior wall of the cervix there was a small area which was bleeding. The uterus was anteverted, and there seemed to be no complications connected with the tubes and ovaries. When the parts were exposed by a speculum, a small umbilical cord was protruding through this aperture. The tissue around the opening was gangrenous. The vagina wall did not seem to be wounded and a placenta was removed which seemed not to be infected. The external os was dilatable so that a curette could be introduced without difficulty. The patient finally made a good recovery with complete healing of the lesions.

Retention of the Blighted Ovum. Litzberg² contributed a paper upon missed abortion. He reviewed the literature and draws attention to the difficulty of diagnosis, and the complications which may arise. He adds his personal report of 13 cases which have come under his observation.

So far as the *etiology* is concerned, it must be considered from two standpoints, first what are the causes of retention or why is the abortion missed, and, second, why does the uterus expel its contents after remaining dormant so long and thus produce a secondary abortion. The cause of the lack of irritability of the uterus which permits the indefinite retention is variously stated by different authors. Some mention central lesions, others the lack of muscular development in the uterus, peritonitis is alleged by others, and there are undoubted cases of cancer, fibroids,

¹ Zentralblatt für Gynäkologie, 1921, No. 35, p. 1243.

² American Journal of Obstetrics, February, 1921, p. 475.

lactation and physical shock which produce retention; atresia and stenosis of the os and cervix may also be responsible for the retention. The most reasonable cause for the final expulsion of the retained ovum is the returning menstrual congestion. This causes bleeding and contraction of the uterus, and this is most apt to happen the longer the time has elapsed since the death of the fetus and the more the congestion caused by the pregnancy has subsided.

Missed abortion is undoubtedly more frequent than reports in the literature indicate. Von Graefe collected 70 cases to 1896, Fränkel brought the total number of cases to 105, in 52 references since 1903 Litzenberg found 756, but has not been able to completely verify these cases.

It is most frequent in multiparæ, but is known to happen in the first pregnancy. Patients sometimes repeat this complication, as one of the writer's cases had two missed abortions in two years. It is frequently the case that medicolegal questions may arise and that unjust suspicion may be cast on a patient because of this condition.

The ovum is finally expelled, although it may be retained for months and years. In one case, fifty-two years after the pregnancy, at autopsy, the ovum was discovered, in another case retention occurred for twenty-eight years. Usually, the fetus becomes macerated and a toxemic condition develops, mummification has been seen, and rarely the ovum may become infiltrated with calcium salts and an intra-uterine lithopedion is formed. Infection rarely develops unless interference of some sort has been practised, putrefaction rarely develops, but decomposition is usually present. Occasionally, the first sign of the blighted pregnancy is the development of sepsis, months after the death of the fetus. It is undoubtedly true that the entire ovum may be resorbed and the writer has seen the entire disappearance of the embryo in an otherwise intact ovum. After the tenth or twelfth week, absorption cannot occur. In some cases a skeleton is formed and nothing is found of the fetus except its bones.

So far as the *pathology* of the condition is concerned, hemorrhage may be a prominent factor or bleeding may be entirely absent, infarcts are numerous in the placenta and ovaries. Processes of degeneration are present, the placenta may be dry, shrivelled, tough, reddish or whitish-yellow or waxy in appearance. One of the great dangers is hemorrhage which may be uncontrollable because the bloodvessels and the wall of the uterus undergo degeneration. There is also a marked difference in the quantity of amniotic liquid and this is usually absorbed; occasionally dropsy of the ovum develops, connective tissue is deposited in some cases producing sclerosis of the placenta. There is often a marked difference in the size of the fetus and the placenta, the placenta being much larger in proportion than the fetus, and this results from the deposit of connective tissue in the placenta, hemorrhage and the fact that oftentimes, after the death of the fetus, the placenta continues to grow. In the early weeks the chorion and decidua may continue to grow because nourished by the maternal blood which continues to circulate, there may be active multiplication of cells. The inner layer

of the epithelia of the villi is early destroyed by necrosis because it is not in direct contact with the blood of the mother. The outer layer in contact with the maternal blood continues to exist until thrombosis takes place and cuts off the supply of blood. The placenta may live and grow, at least in the early months, after the death of the fetus, although this phenomenon does not develop in the second half of pregnancy. Microscopical studies of the retained ovum show the characteristic changes of these various processes.

So far as the patient's symptoms are concerned, when the death of the fetus occurs, the signs of abortion cease to develop and it may be thought that abortion has ended or has been avoided. At an indefinite time afterward the physician may be consulted because bleeding continues or because the uterus has not grown larger or fetal movements have ceased and other signs of pregnancy have gradually disappeared. The uterus has not grown smaller after the death of the embryo nor is it as soft as usual in pregnancy, while it is not as hard as a fibroid. The breasts grow smaller and secretion may disappear. The patient may become indefinitely ill, with symptoms of gradually developing toxemia. There is loss of flesh, a chilly sensation, a foul taste in the mouth and a bearing-down feeling or weight. In time, the patient becomes very anemic, with afternoon fever; in some patients the mind is affected. Cases, however, often carry a retained fetus for several months without symptoms. Hemorrhage is a very irregular complication of these cases and may be sudden and profuse if manipulation is practised. If the uterus becomes extensively degenerated, hemorrhage may be fatal.

In those who are familiar with the complications of pregnancy, missed abortion is not often overlooked, with those who have an ordinary or cursory knowledge, the diagnosis is frequently missed. This condition should be suspected if menstruation has been missed several times, the patient has had symptoms of threatened abortion which have subsided and the uterus does not continue to grow. To determine this, examinations should be made at regular intervals, perhaps a month apart, and if the size of the uterus is carefully noted and accurate records kept, its diminution in size is demonstrated. Sometimes the symptoms resemble those of malignant disease and in any patient in whom the suspicion of cancer arises, the possibility of a missed abortion cannot be neglected. The writer describes the case of the wife of a physician who had missed two menstrual periods and had irregular bleeding, she became anemic and ill, with afternoon temperature. She was examined by several physicians and various laboratory and local tests were made without finding an adequate cause. When the uterus was emptied the removal of a blighted ovum ended the symptoms at once.

The prognosis is usually considered more favorable than is really the case. It is true that in almost all cases the ovum is finally expelled, but before this happens the woman may readily become the subject of anemia, invalidism or infection. The possibility of fatal hemorrhage cannot be disregarded.

There can be no question about the necessity for emptying the uterus. It may be difficult to dilate the cervix because of its unusual hardness,

and, should this be the case, vaginal Cesarean section is indicated, otherwise dilatation and curetting, followed by packing are usually sufficient.

The writer concludes that this condition is by no means uncommon and that the exact cause is unknown. It may produce in the mother temporary, or permanent, ill health, or may even end fatally. It is important from a medicolegal standpoint. The essential elements in diagnosis are the gradual disappearance of the signs of pregnancy, the occurrence of irregular bleeding and afternoon fever and this fever with no other signs is very suggestive. Obviously, the uterus should be emptied promptly.

THE FREQUENCY AND CAUSE OF ABORTION. Meyer,¹ has studied 700 selected histories which accompanied specimens sent to the Carnegie Embryological Collection of the Stanford Medical School. These records seem to show that there is 1 abortion to 1.7 pregnancies. From various computations the frequency of criminal abortion in the United States probably exceeds the grand total of abortions from all causes. Various estimates have been made as to the relative frequency of abortion and pregnancy and labor, and probably 1 abortion occurs at least to every 5 or 6 births.

If the statements made by various workers in sociology are considered, the frequency of criminal abortion would be very great, but undoubtedly there is an element of exaggeration in these statistics. It may probably be estimated that there is a prenatal mortality with the product of conception in 22 per cent. Abortion is probably more common among the well-to-do than among the very poor. Among animals kept under conditions where they can be observed, abortion occurs but one-seventeenth as frequently as in the human subject. Care must be taken, however, to avoid error in these estimations as many statistics quoted cannot be considered accurate. In 697 selected cases, there was no mention made of previous abortions in 11.4 per cent, but among these women only 3 could assert that they had suffered no previous abortion. In most cases there was no record upon this point. Evidently, however, most women in the child-bearing age who are exposed to impregnation, suffer abortion. While repeated abortion is not uncommon, but a small percentage abort as frequently as five or six times, there are a few cases of false pregnancy and unusual cases where the correct diagnosis has not been made, which impairs somewhat the accuracy of these observations. The great majority of abortions occur before the fifth month, and there is a marked increase from the first to the second, as well as a decrease in the sixth and seventh. The reason for this is probably found from the fact that the woman first becomes aware of her pregnancy at about the second month, but at the fifth or sixth months the movements of the fetus give her the impression of life which deters her from producing abortion. Only a third of these abortions occurred in the third month, although this is the usual belief; 98.2 per cent aborted before the seventh month.

¹ American Journal of Obstetrics, August, 1921, p. 138.

When each group of cases is considered, there is a remarkable agreement between the average number of full term pregnancies and abortion, in each woman. Each woman seems to have 4.54 full term pregnancies and 4.54 abortions. As these statistics embrace all classes of society, they would indicate that the general results are the same independent of nationality, social conditions, or environment. A considerable number of these women who aborted never produced a child. It has been thought that abortion was most common in primiparae, but this study does not indicate that, and but 12.9 who aborted were in their first pregnancy. In women who have born more than one child, the frequency of abortion is increased, and the second increase occurs if as many as four children are born. In the series there was 0.84 previous abortion for every child born and, if all of the records are included, the ratio becomes 1.3 abortions to every child. This makes the percentage of children considerably larger. When there are several children in the family, from three to seven, there is a relative number of abortions to children, which would seem to indicate that the factors responsible for interruption of pregnancy occur with exceptional regularity in women of widely different reproductive histories. As to abortion in regard to the age of the women, 77.4 per cent were less than thirty-five years of age. Women as young as fifteen to nineteen years of age showed the greatest number of abortions, 4.8 per cent, then the frequency drops as the women grow older, after twenty-four years of age the average number of abortions to the average number of children grows less. While it is impossible to accurately estimate the number of children born of each woman in civilized countries, statistics would indicate that on the average each woman bears from three to four children. Abortion is more frequent among the unmarried, with the exception of the years from fifteen to nineteen in married women, when abortion is uncommonly frequent.

When the ovum is subjected to some pathological process, there is slight increase in the frequency of abortion. When the embryo is diseased, abortion occurs earlier than when it is not, but a diseased embryo is retained longer among younger than among older patients. Little more than half of the patients suffering abortion are younger than thirty years. No definite conclusions can be drawn in endeavoring to compare the negro and the Caucasian races. The self-induction of abortion is not, as a rule, recorded among negro women; therapeutic abortion occurs once in 1.3 per cent of negro women but in 6.6 per cent of white women. The percentage of one child sterility is less among negro women than among white women. Abortion occurs later among them and this is probably caused by the fact that the average white woman obtains medical attention more early in her pregnancy than does the average negress; as a rule mechanical interference is much more common than interference produced by drugs.

As to the *immediate cause of abortion*, tumors and displacement of the uterus and self induction are the principle cause. The majority of these abortions were inevitable, and a very interesting fact arises that one cannot account for the occurrence of spontaneous abortion by examina-

tion of the specimen. There was pronounced change in the chorionic vesicles and also the decidua of most of the specimens.

Hydatidiform degeneration in the embryo is not uncommon, during the early months, pathological conditions in the chorion and decidua undoubtedly cause most of the abortions. The decidua alone is considered by some the essential element. Often abortion follows a slip or slight fall, usually on the stairs or after some unimportant mental disturbance. This is probably an exaggeration and these causes would not produce the effect were there not some abnormal condition in the embryo or uterus before the disturbance occurred. A familiar example of the causal relationship of the acute infections and abortion was given by recent epidemics of influenza. This acted by producing an abnormal condition of the decidua. A surprisingly small percentage of abortions follow venereal diseases. The writer's researches, like those of others, indicates that when an abortion is inevitable the physician should not temporize but promptly relieve the patient of an abnormal, dead, or dying fetus.

In looking over the histories of these more than 600 cases, it is interesting to observe that in the early months of pregnancy abortion seems to be a very gradual process; it is better, however, not to wait, but as soon as the condition is reasonably certain, the uterus should be emptied. An added reason for this lies in the fact that an injured or imperfectly developed ovum cannot develop into a healthy child and hence the physician is justified in interfering promptly.

Interesting cases are on record where twin pregnancy has occurred and one twin embryo has aborted weeks or months before term while the other has gone on to uninterrupted development. The question arises in such cases as to whether superfetation has been the real condition present.

The term habitual abortion is in common medical use, this frequently occurs early in the married life of the young woman and continues with more or less interruption throughout her child-bearing period. Sometimes a child at term is followed by several abortions, many of which were produced by the patient. The records of other cases would show that after the birth at term women often take measures to interrupt succeeding pregnancies. Successive abortions indicate most often that there are depressing influences affecting the general health of the mother and continuing through a number of years make the continuation of pregnancy impossible. Closely repeated pregnancies very markedly tends to abortion.

TREATMENT OF ABORTION. Adair¹ reviews the literature upon this subject and gives a summary of recent practise and opinion.

In speaking of hemorrhage he quotes familiar statistics to the effect that hemorrhage in early abortion is practically never fatal. As pregnancy goes on after the first three months, the danger of hemorrhage becomes somewhat greater, but it is estimated that not more than 8 to 10 per cent of abortions require a vaginal packing to control hemorrhage.

¹ American Journal of Obstetrics, July, 1921, p. 105.

He believes, however, that one profuse hemorrhage, several moderate hemorrhages, or a continuous moderate hemorrhage may so deplete the patient, that she is rendered more susceptible to infection. Such cases he would treat by absolute rest, elevation of the foot of the bed, abundant fresh air and the avoidance of all manipulation; for he has found these usually sufficient to check hemorrhage. If pituitrin and ergot are given, the hemorrhage is increased until the uterus expels its contents, when the hemorrhage ceases. The writer has, however, found that hemorrhage during abortion may often be checked by $\frac{1}{8}$ to $\frac{1}{6}$ grain of morphine with $\frac{1}{200}$ to $\frac{1}{100}$ of atropine. He states that codeine is dangerous in these cases, but he does not give the reason for this belief. If interference becomes necessary, it should be done under careful antiseptic precautions with the aid of a speculum, and blood-clots and tissue should be removed from the vagina and cervix. The vagina should be tightly packed with iodoform gauze, and the general treatment for hemorrhage should be given.

In threatened abortion, pregnancy may continue, although a considerable quantity of blood is lost. When the patient has spasmodic headache, cramp-like pain in the lower abdomen and hemorrhage, the pregnancy may still go on. Morphine and atropine should be given freely, the patient put at absolute rest in bed, cathartics should be avoided and the bowels should be carefully moved with small enemata or suppositories if necessary. The patient should remain in bed for at least a week after active symptoms have subsided. If, however, the patient develops fever, a discharge with odor and the escape of amniotic liquid and shreds of membrane, the abortion must be treated as inevitable. If there is reason to believe that abortion is inevitable but without fever and without hemorrhage, one may wait for the spontaneous expulsion of the uterine contents or may empty the uterus immediately. If the operation be properly done, there is practically no danger in emptying a non-infected uterus. Where there is serious hemorrhage, a firm, vaginal packing should be used and removed in twenty-four hours when the uterine contents will usually be expelled. When abortion is inevitable and the patient is infected, no interference should be practised until the patient has been without fever for several days. The presence of streptococci in material obtained from the uterus should forbid all manipulation. Under ten weeks of pregnancy it is safer to use instruments in the uterus than later on, because the uterine wall is thicker and there is less danger of puncturing the uterus. He believes the uterine contents should be removed with forceps or finger, rather than the curette.

Concerning the *treatment of incomplete abortion* there is great difference of opinion. There is an average mortality of 3 per cent in these cases which cannot be neglected. While the danger of hemorrhage is not great, the infection is always a present risk and may become a fatal matter. The most dangerous cases are those of criminal abortion and those where there have been repeated examination and sometimes efforts to empty the uterus. Without vaginal manipulations the percentage of infection in abortion should be very small. Cases of

incomplete abortion without fever, with or without bleeding, may have the uterus emptied with proper precautions, with relative safety. Cases with fever (with or without hemorrhage) require careful handling; if it is necessary to check bleeding by interference, as little as possible should be done and with great gentleness. In most cases the cleansing of the vagina and careful packing is sufficient. It is probably safest to avoid interference with febrile cases and not to invade the uterus while fever is present. If the patient is without fever from two and a half to five days after abortion, it is comparatively safe to perform a curetting. The treatment of incomplete infected abortion should be expectant, with interference only to control hemorrhage; rest in bed, plenty of fluid, abundant nourishment and fresh air.

Complete abortions without infection require only rest and general care. Infected cases should be subjected to no manipulation, except the drainage of a uterus in malposition or the drainage of a localized abscess.

The writer estimates that 50 per cent of cases of salpingitis, requiring operation, have followed abortions. It is evident that a considerable field of pathology is developed by this accident.

Induced abortion, whether criminal or therapeutic, is dangerous in proportion to the amount of interference, with the presence or absence of skill, and aseptic precautions in this interference. Estimates of the relative frequency of abortions and births vary greatly. In the writer's series of cases quoted from the literature, he found 1 abortion to 3 births to be the average ratio.

He believes that syphilis has been overestimated as a cause for early abortion. Repeated abortion requires careful study to ascertain the conditions which produce it. Pregnancy recurring too rapidly is often the cause; mechanical conditions of the uterus are frequently present. The treatment of this condition consists in removing the cause. The writer believes that corpus luteum is useful in selected cases. Some require rest in bed and some are benefited by the administration of uterine sedatives. The avoidance of emotion or excitement is clearly indicated.

Ruth¹ decries the use of the curette which he believes may inflict serious damage and possibly render the patient sterile after its employment. He describes an instrument somewhat resembling the placental forceps which is introduced into the uterus, its blades somewhat separated and then rotated so that every portion of the uterine cavity is thoroughly gone over by the instrument. Its use is based upon the fact that in early pregnancy the uterus is practically a globe.

Latzko² contributes an extensive paper on the treatment of abortion complicated by fever. His is the controversy so frequently waged between what is called the expectant and active treatment, and he reviews the literature of those who have recently written upon the subject. In 5870 abortions, 33.5 per cent had a temperature above 101° F. and in eighteen years under his observation, 9000 abortions had 30 per

¹ American Journal of Obstetrics, April, 1921, p. 700.

² Zentralblatt für Gynäkologie, 1921, No. 12, p. 425.

cent with fever and 298 deaths. Up to the year 1914 they were treated by active interference, after that by the so-called expectant method. After a long test of bacteriological examinations, such are considered worthless as practical indications for treatment. Where the patient becomes severely ill, the blood is examined bacteriologically, and, if opportunity arises, the pus which forms in peritonitis.

He manages his cases of abortion by abstaining from interference until fever develops. He has frequently seen a rapid spread of infection following the artificial emptying of the uterus, if such be done at the very beginning of fever; on the other hand at the end of the first week of fever, it is often possible to thoroughly explore the uterus without reaction, and the indication for such exploration is the occurrence of severe hemorrhage. Exploration is preferably done by the finger aided sometimes by placental forceps and, as rarely as possible, by the curette. The latter is considered the most dangerous of all instruments. In some cases he finds a better result in checking hemorrhage by the use of ergotin than by interference. He adds the temperature chart of a patient who had high fever with chills. On the eighth day after the development of fever, a decomposed placenta was removed without difficulty followed by prompt improvement. In general, in his experience, the mortality of cases treated promptly by active interference has been 50 per cent higher than those treated by the more expectant plan. He admits by the expectant method the patient is kept longer in the hospital and longer in bed wherever she may be. Nine days is the average where active treatment is done, and with expectant treatment fifteen and seven-tenths days. Among the poor and dependent who can ill afford continued illness, this is a matter of considerable importance. When there is a tendency to hemorrhage, severe anemia may develop, which delays recovery. It is often difficult to keep patients quiet, as they do not appreciate the importance of abortion.

Prinzinger¹ gives his experience in the clinic at Stuttgart in the management of these cases. In brief, his experience is like that of the preceding writer, and he quotes statistics of seven other German clinics showing similar results.

Kaschke² joins with others in stating that bacteriological examinations cannot be relied upon to determine the necessity for interference. He has tried to rely upon this method of diagnosis and to base his interference upon the bacteriological findings, but his results have been worse than when he relied exclusively upon a thorough careful bimanual examination. From his clinic, an assistant, Bribram³ reports a case of fatal hemorrhage following abortion. The patient, a multipara, aged thirty-six years, was admitted to the hospital in a very anemic condition, hemoglobin 36 per cent. The fundus was four finger breadths above the symphysis, a clot of blood was very easily removed from the dilated cervix. The patient was given drugs to cause uterine contraction; she believed herself to be five months pregnant, but for three days she had had more or less severe hemorrhage. She did not see the fetus expelled.

¹ Zentralblatt für Gynäkologie, 1921, No. 11, p. 401.

² Ibid., No. 44, p. 1889.

³ Ibid., No. 41, p. 1483.

As the bleeding ceased on her admission to the hospital, no interference was practised except the giving of preparations of ergot and pituitrin. On the night following, the patient endeavored to empty the bowel and bladder, and discharged a clot of blood as large as the fist of a new born infant, collapse followed, the action of the heart failed, the hemoglobin was 26.2 per cent, temperature subnormal. Some improvement followed the giving of cardiac stimuli. It was then thought necessary to explore the uterus with as little disturbance as possible, when it was found that the finger brought away a necrotic and exceedingly foul portion of the placenta, the placental tissue still remaining was removed very gently by a blunt curette. There was no hemorrhage, the uterus contracted well and the patient seemed to rally under stimuli. Two hours later she died in collapse. Autopsy showed intense anemia, the spleen softened and enlarged, the lungs edematous, the heart normal. The patient's death must be ascribed to her continued hemorrhage before entering the hospital for which nothing had been done.

In the *American Journal of Obstetrics*, November, 1921, page 521, Gordon gives the results of 530 cases treated in Bellevue Hospital; 100 of these patients were followed up after leaving the hospital and examination was made by a member of the staff. Of them, 81 were able to be up and about without bleeding; 19 had been discharged with slight bleeding and a pessary, and two weeks after leaving the hospital 80 were well, with no hemorrhage, 17 had return of menstruation and 3 had considerable flow. The conclusion obtained from the study of his cases is in favor of the so-called conservative treatment, the more the manipulation and interference, the higher the mortality and morbidity, is his conclusion.

One-fourth of his cases he regarded as septic, such did best with abundant fresh air, the Fowler position, forced feeding, while some had repeated blood transfusion in small quantities, others had salvarsan intravenously and others vaccination and sera. We do not gather that these later methods of treatment were considered very important or efficient.

LABOR.

Substances in the Placenta which Stimulate Uterine Contraction. Guggisberg¹ draws attention to the fact that in his clinic in Bern he has demonstrated the presence in the placenta of certain substances which have the property of stimulating uterine contractions. These same organic extracts are also present in the thyroid. It is possible to make extracts of the placenta which can be used in stimulating uterine contractions in labor. The familiar action of pituitrin is an example of this same fact.

Puppel writes concerning the use of *placental extracts to stimulate labor*. He prepares from an average placenta 200 gm. of optone. He first used 1 ccm. of a 5 per cent solution, which produced violent uterine contractions and he has been obliged to lessen the dose. He has pre-

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1921, vol. 54.

pared a preparation called placental optone, which is to be used in 5 per cent solution, given by injection into the muscles. He describes 3 cases of labor in which he used this preparation with excellent results. In 2 of the patients there was postpartum hemorrhage, which was readily controlled. The same substance was given to 3 patients who had deficient secretion of breast milk but no result could be observed. Later, in cases of delayed and painful menstruation, the preparation seemed to be useful and to bring on the occurrence of menstruation. As many as nine or ten injections of 2 ccm. were given in some cases.

Martin contributes a paper on the effect of *placenta optone* as a remedy for increasing uterine contractions. He describes the case of a primipara, aged twenty-nine years, in whom the pains of labor completely subsided after fourteen hours. One injection of placental optone was followed by the development of good pains and the spontaneous birth of one of twins. The second was delivered by version. Another case of a primipara had premature rupture of the membranes. Child in breech presentation, and pains were greatly stimulated in the same manner. His third case was a woman in her second labor, the fourth one, a woman in her eighth labor, another in the fifth; and in all of these there was a positive and beneficial result obtained by the injection of this substance. He also reports the case of another primipara, who gave birth to a large child, whose pains were greatly increased by the hypodermic injection of this substance. In some of these patients it was necessary to give as many as four injections, and, in one, eight injections were given. In order to lessen the number of injections, it was desirable to use a solution as highly concentrated as possible.

The Old and New Treatment of Placenta Previa. Lonne¹ publishes a brief statement of the treatment of placenta previa in the clinic at Dortmund. It has been customary to treat these cases by the use of a dilating bag, inserted within the membranes, and this has generally given good results. In a series of 200 cases there were 4 deaths from central placenta previa treated by version and extraction. Three of these had the dilating bag used before the version. In 2 cases there was fatal hemorrhage after the uterus had been emptied; and there were 3 deaths from septic infection. It was observed that the use of the dilating bag caused violent uterine contractions, and that in these cases the danger of postpartum hemorrhage is very considerable. The use of the dilating bag in placenta previa is dangerous in direct ratio to the amount of pressure made by the bag. Where pressure is considerable, the lower uterine segment is stretched. The upper segment may be made to contract strongly and the result is that paralysis of the lower segment occurs with postpartum hemorrhage. It must be remembered that in placenta previa the placenta is attached to the lower segment, and unless pressure is brought to bear upon this portion of the uterus after it is emptied, there is nothing to check hemorrhage. For these reasons the use of the bag in placenta previa must be carried out with caution. In

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1921, 55, 190.

contrast with delivery by abdominal section, the use of the bag is at a disadvantage.

Induced Labor. That induced labor may be complicated by hemorrhage, apparently, but not actually produced by the induction of labor, is shown by Davis.¹ He describes 4 cases in whom labor was induced by the introduction of bougies, in 3 hemorrhage followed and in 1 of these, a multipara, husband and wife requested delivery by section with sterilization. On examining the body of the uterus, it was found that the bougie had done no damage but that chorioepithelioma was present. Five years after the operation the patient was in good general health. A second patient had induced labor for prolongation of pregnancy which threatened an overgrown child, hemorrhage followed the introduction of bougies with symptoms of separation of the placenta, section was immediately performed when the placenta was found partly separated but the bougie was on the opposite side of the uterus and had not touched the placenta. Uncomplicated recovery of mother and child followed, the mother afterward giving spontaneous birth to a well-formed child. At this time the hand was introduced into the uterus when empty and no evidence of weakness of the uterine scar nor the presence of a scar could be found. In the third case hemorrhage followed the introduction of bougies and was checked by vaginal packing. Labor was terminated by forceps with uncomplicated recovery of mother and child. No cause could be found for the hemorrhage.

The fourth case illustrates the fact that a bougie may pierce the substance of the placenta without producing complications, such a condition was found in a patient who had induced labor and was delivered spontaneously.

Induction of Labor by Rupturing the Membranes and Giving Quinine. Fulop² draws attention to the fact that the induction of labor by bougies may be prolonged. The use of dilating bags is estimated to have a maternal mortality of at least 4.2 per cent and the bag often produces an abnormal presentation. The writer urges the value of the rupture of the membranes and the withdrawal of a small quantity of fluid as a safe and fairly prompt method. After careful disinfection, an assistant holds the head of the fetus firmly at or in the brim of the pelvis, the membranes are then ruptured with closed uterine dressing forceps and an abdominal binder is applied and two hours afterward a 25 per cent solution of the bihydrochlorate of quinine in a 50 per cent solution of quinine hydrochlorate is given intravenously, $\frac{1}{2}$ gm. of the bihydrochlorate being administered. This solution is also injected into the substance of the muscles, if uterine contractions are not efficient, the intramuscular injection is repeated. In 2758 cases of pregnancy and labor, this method was used in 15, it was employed for contracted pelvis and in 1 case for a serious condition of the heart. The period of gestation varied from two hundred and thirty-one to two hundred and ninety days; on an average, labor pains began in two and three-tenth hours after the treatment was given. On an average, labor was complete in twenty-four and

¹ American Journal of Obstetrics, July, 1921, p. 1.

² Zentralblatt für Gynäkologie, 1921, No. 31, p. 1103.

nine-tenth hours, 1 patient had slight fever afterward but was discharged well in twenty-five days. In 2 cases there was light asphyxia in the children which speedily terminated. One case of premature child with feeble heart action could not be resuscitated and autopsy showed a lesion of the brain. To these 15, he adds 2 other cases done just before publishing his paper, which terminated favorably.

Phillips,¹ in thirty-six years of private practice, has interrupted pregnancy in 57 cases: acute albuminuria 18; glycosuria 2; uncontrollable vomiting 15; uncompensated cardiac disease 11, acute salivation 1; chorea 1; placenta previa 6; cancer of the breast 3. There was no maternal mortality and a consultation was held in all these cases. Many of them were women in early pregnancy. While the indications may be clear for interference in the majority of complicated pregnancies which occur, some may be helped by other means. In cases of mental disease complicated by pregnancy, a decision is sometimes difficult. If pregnancy is to be interrupted, the writer believes that it should be done before the tenth or twelfth week. No rule can be laid down regarding such patients but each must be studied in accordance with the conditions present. It is difficult to decide also in cases of retroflexion and impaction of the pregnant uterus. The writer has never personally met with a case in which pregnancy could not be carried on. If he were to interfere it would be by abdominal section when the uterus could be drawn up out of the pelvic cavity under the guidance of direct vision.

The writer does not believe in interrupting pregnancy for tuberculosis and he states that the majority of English obstetricians are of this opinion, nor would he interrupt the pregnancy for epilepsy, only for paraplegia; and where the mother has some deformity or malformation, it does not follow that the child will have the same and hence it should be allowed to develop to term without interference. In early pregnancy the uterus should be dilated under an anesthetic, ovum forceps introduced and the product of conception removed entire. The uterus should be explored by the finger, washed out with tincture of iodine, one teaspoonful to the pint or swabbed out with iodized phenol. This the writer thinks is unnecessary but not objectionable, gauze packing he would decline. Later in pregnancy, to bring on labor he would use laminaria tents or small de Ribes bag which he has had made for the purpose and a larger bag later if necessary.

Spontaneous Versus Artificial Labor. American obstetricians are at present passing through a reaction against interference in parturition. The success obtained in various obstetric operations in the hands of skilled and competent obstetricians under adequate and proper conditions has led to unduly frequent and improper interference with labor. This has been done by two classes of obstetricians, first those men who practice obstetrics because they do not dare not to include obstetric practice in their general work, and second, a few obstetricians who have perfected certain lines of interference and have become extraordinarily proficient in some operation and get extraordinary results.

¹ *Lancet*, February, 5, 1921, p. 266.

In the first class of cases, the results are especially disastrous regarding the health of the woman after parturition; for while she may escape death, the shock and lacerations produced by improper interference may seriously impair her subsequent health. Among those experts who push to extreme a given interference, the results for the patient are better than when operations are done by unskilled operators, but each of these are unnecessary and must be accompanied by morbidity if not by mortality. When obstetric practice is conducted by version and Cesarean section only, some patients escaping these operations by unexpected spontaneous delivery, it is questionable whether this is consistent and wise practice, and this is equally true when, on the other hand, labor but partially develops and is at once made artificial, necessitating forceps delivery, the closure of extensive wounds being a frequent occurrence. This can scarcely be viewed as rational obstetric art; on the other hand, in the practice of studious and conscientious obstetricians, there can be no question but that the lives and health of parturient women are frequently saved by obstetric surgery. A considerable number of needless obstetric operations have been practically excluded from performance and the indications, for what may be called the standard operations, are better defined and more widely accepted.

AGAINST FORCED LABOR BY VARIOUS METHODS. Polak¹ contributes his protest. He draws attention to the failure of dilating bags to induce labor and believes that elective version is not justified in a large percentage of cases. He would not interfere in labor without a positive indication.

The Complications of Labor. LABOR COMPLICATED BY BREECH PRESENTATION WITH EXTENDED ARMS. Reported by Gooch.² The patient was very large, with a very roomy pelvis and fat abdomen, a hand presented, but little else could be made out regarding the mechanism of the labor, finally a child weighing four and three-quarter pounds was born in breech presentation with both arms extended down the sides of the trunk, the thighs and knees being flexed.

THAT SUBCONTINUOUS SYMPHYSIOTOMY HAS NOT BEEN ENTIRELY ABANDONED is shown by Lindermann.³ He operated in this manner in 36 cases of narrow pelvis. There was no maternal mortality and fetal mortality was 8.1 per cent. The operation was selected very carefully and seemed to be superior to pubiotomy.

INFECTION OF THE BREASTS COMPLICATING LABOR. Dorman⁴ contributes a paper upon this subject showing, among other things, by a table of quotations, the great diversity which exists in the matter of treatment. To prevent mastitis, prenatal care and preparation are valuable. A lavish fluid diet should not be given immediately after confinement to stimulate the flow of milk as distention of the breasts may develop. For damaged nipples, a dressing of tincture of benzoin,

¹ American Journal of Obstetrics, September, 1921, p. 237.

² British Medical Journal, April, 23, 1921, p. 624.

³ Archiv für Gynäkologie, 1921, vol. 113.

⁴ Journal of the American Medical Association, August, 1921, p. 509.

of bismuth and castor oil, or a lead nipple shield may be used. If the nipple is damaged, nursing should be done through a glass nipple shield. If there is bleeding, nursing should be temporarily stopped. The breasts and nipple should be protected by sterile gauze. Infection in the infant should receive prompt attention. If there is one-sided mastitis, care should be taken to avoid contaminating the normal breast.

With the precautions mentioned in 1000 cases, there were 21 cases of mastitis, with 3 abscesses.

In discussion, massage was condemned, after the use of the ice-cap the child should not nurse for at least twenty minutes to half an hour after the ice-cap has been removed. The first sign of abscess is edema of the skin over the inflamed area.

Seitz,¹ applies *heat* to the puerperal breast *to produce hyperemia and thus avoid mastitis*. He illustrates his apparatus which relies for its source of heat upon electricity, 1 milliampère is the extreme current required and usually 0.4 to 0.6 milliampères is sufficient. The first application should be five minutes, and none should exceed ten. It is observed during pregnancy this treatment causes an increase in the development of the breasts, and that during the puerperal period the secretion of milk is also increased.

DYSTOCIA DUE TO CONSTRICTION OF ONE THIGH BY THE CERVIX IN A CEPHALIC PRESENTATION. Greenhill² reports the case of a patient who had twice before coming to the hospital believed that she was in labor but whose uterine contractions had gradually ceased. The cervix had not dilated nor become effaced and the membranes remained intact. A former pregnancy and labor had been normal. The general condition of the patient was good, the pelvis normal. When labor finally developed, the membranes had ruptured three days previously. Under obstetric anesthesia, the cervix gradually dilated and the head and thorax were easily delivered, and the body up to the umbilicus when progress ceased. The child cried lustily and, on examination, the left leg of the child was doubled up in the vagina. This was readily delivered but the cervix closed down upon the right thigh and it could not be delivered without deep maternal anesthesia. The leg was greatly swollen and apparently there had been a constriction just below Poupart's ligament. The edge of the cervix was thick and moderately firm. For a number of hours before delivery the mother was in a condition bordering on frenzy apparently from pain and excitement.

LABOR COMPLICATED BY FIBROIDS. Marshall³ contributed a paper upon this subject before the Glasgow Obstetrical Society. He describes the case of a patient seven months pregnant who had a large subserous fibroid projecting from the anterior uterine wall at the border of the umbilicus. Spontaneous delivery resulted but with each uterine contraction the tumor became very hard and projected, causing extreme pain.

Marshall divides these cases into those who might safely come to term,

¹ Zentralblatt für Gynäkologie, 1921, No. 48, p. 1748.

² Journal of the American Medical Association, January, 14, 1922, p. 98.

³ Lancet, December, 10, 1921, p. 1218.

and those in which myomectomy could be done and those requiring hysterectomy. In the first class operation should not be performed, pain and hemorrhage should be looked for and avoided, and rest and sedatives were usually sufficient.

When a subserous fibroid becomes twisted and necrosis develops, if the fibroid prolapses or becomes impacted in the pelvis, it might be well to remove the tumor, but myomectomy is most successful in subserous tumors. Interstitial fibroids should not be removed during pregnancy, because of the danger of hemorrhage, the weakness of the uterine wall and the frequency of abortion. In the third class, operation was imperative. In some cases it is possible to push the fibroid out of the pelvis thus permitting spontaneous labor. Where the obstruction becomes serious, if the patient is in good condition, Cesarean section should be performed. It is often possible to remove the fibroid some time after labor, leaving the uterus, but if tumors were extensive and infection possible, hysterectomy was indicated. Craniotomy and pulling the child past the obstructing fibroid with forceps should be condemned.

Postpartum hemorrhage was to be expected unless the uterus had been removed. Pressure or injury during labor might readily be followed by sepsis. In some cases uterine fibroids lessen very greatly in size or disappear after labor.

In discussion, Munroe Kerr believed that many of these patients could safely come to term and many of them be spontaneously delivered, as fibroids were apt to degenerate during pregnancy, these patients require rest, and increased elimination. If one of several tumors cause trouble, this tumor could often be removed.

Before the Edinburgh Obstetrical Society, Ferguson¹ described 4 cases of inversion of the uterus; 2 occurred after labor, 1 with a fibroid polyp and 1 with an adenocarcinoma; vaginal hysterectomy was done in 3 cases and 1 puerperal patient had the abdomen opened, the constricting ring dilated and the uterus reinverted by pressure through the vagina, these patients made good recoveries. In acute inversion, the condition was not as uncommon as supposed, the mortality being 30 per cent principally caused by shock. In treating these patients, no prolonged effort should be made to replace the uterus. If one effort fails, the second should be delayed, as the shock of prolonged and violent effort to replace the uterus might prove fatal. The placenta should be stripped off, the vagina tamponed with gauze and shock should be treated; pituitrin should be avoided. In chronic inversion undoubtedly surgical procedures were best and, if the uterus was septic, damaged by manipulation, or had undergone fibroid changes, vaginal hysterectomy was indicated. If the uterus and patient were in good condition, abdominal operation should be chosen. The mortality in the vaginal operation is usually less. If necessary, the vagina should be incised.

INFECTION BY SAPROPHYTES, DEVELOPING DURING LABOR. Sternberg² has studied the effect of saprophytes in the genital tract of the patient during, and after labor. He finds that ordinarily these germs

¹ British Medical Journal, February, 4, 1922, p. 192.

² Zeitschrift für Geburtshilfe, 1921, 84, 447.

are kept in their innocuous condition by the resisting substances in the patient's body, but that the same germs may readily become parasites if the resisting power of the patient is lessened. Infection is to be accounted for in many cases by the lessened resistance of the patient or by unusual virulence of the germs combining with lessened resistance of the patient.

In some cases, germs seem so virulent that no resistance is possible. We recognize the normal acidity of the vaginal secretion and the epithelial covering of the genital tract as of great importance in protecting the patient, but the principal reliance against sepsis must be the innate and resisting power of the patient's tissues.

THAT THE DELIVERY OF THE PLACENTA MAY BE AFFECTED BY THE INSERTION OF THE UMBILICAL CORD AND THE DIRECTION OF ITS SPIRAL VESSELS, is alleged by Kocheneichler.¹ He finds that when the vessels of the umbilical cord are spiral from left to right they pursue this course particularly in their insertion into the membranes, especially if the spirals are closely twisted; when, however, the spirals are less close together, there is a considerable difference in the insertion of the umbilical cord. This exercises an influence upon the membranes and upon the tension produced upon the placenta, and this has a considerable influence in the mechanism and method of the placental delivery. In connection with the contraction of the uterus, it has an influence in the loosening of the placenta.

LACERATION OF THE VAGINA DURING LABOR is reported by Dyroff.² The patient was delivered under the care of a midwife, with very strong uterine contractions, almost without intermission. The head was expelled spontaneously without control, and the after-birth came spontaneously a half hour later. Lacerations were so severe that the patient was at once brought into the hospital where the perineum was found torn to the anus, although the sphincter had escaped. There was a transverse laceration in the vagina and the tissues were torn in several directions. On the right side, the lacerations had opened a vessel of considerable size. On removing blood clots, it was found that the lacerations were deep and extensive. They were immediately closed successfully. The child was not especially large, nor the pelvis of the mother unusual in shape, and the lacerations had evidently resulted from lack of elasticity in the mother's tissues and failure to control her during labor. There was no postpartum hemorrhage but the patient had some fever. Involution proceeded well and after the fifth day vaginal douches were given. Most of the sutures resulted in permanent union, but in some portions of the vagina union occurred by granulation.

AIR EMBOLISM COMPLICATING LABOR. Fink³ reviews the literature of this subject, which illustrates a common belief that air embolism is a very definite danger to the parturient woman. Evidently interference during labor, as in replacing a prolapsed umbilical cord, introducing a dilating bag, performing version or using forceps must give opportunity

¹ Monatsschrift für Geburtshülfe, 1921, **54**, 143.

² Ibid., 7.

³ Zeitschrift für Geburtshülfe, 1921, **83**, 632.

for this accident, especially is this true if a portion of the placenta has been separated. If the abdominal tension is changed from positive to negative by the patient changing her position, this may predispose, so if the amniotic liquid escapes very rapidly there is additional danger. A very deep respiration on the part of the patient when a portion of the placenta has been separated may set up negative pressure in the abdomen which may produce this complication. Cases are on record where an excessive discharge of amniotic liquid or sudden or rapid delivery has been followed by air embolism.

The writer has found 60 cases reported more or less completely, and these he tabulates with the names of the reporters, 41 of them seem to have been genuine cases, atmospheric pressure seems to have been responsible in 61.5 per cent of the cases, and production of negative pressure in 32.5 per cent. As to whether such an accident can actually cause death, authorities consider that there can be no doubt. Death from this cause is fortunately rare. Some very striking cases are reported, one of twin pregnancy where, in endeavoring to dilate a rigid os, air was injected into the vagina, followed by sudden death, autopsy showed that both the placenta had become partly separated giving entrance to air. Vaginal injections are dangerous for this as well as other reasons. The greater the pressure by the injection, the greater the danger. Medicolegal literature contains authentic cases.

The writer reports the case of a woman, aged forty years, admitted to the hospital for repeated hemorrhage from the vagina; the uterus was enlarged, soft and anteverted and an effort was made to induce abortion by the introduction of a laminaria dilator which was removed because fever followed its insertion. While the uterus was dilated and the remnants of an ovum and its appendages were removed, this was followed by a hot intra-uterine douche of 2.5 per cent cresol. The patient rallied promptly from the anesthetic, was taken to her bed in the ward, but a few moments afterward died suddenly after a few feeble respirations. Autopsy showed pus in the left Fallopian tube, slight lacerations at the internal os, a smaller laceration on the posterior wall of the uterus. The right ventricle of the heart was flaccid and the right side of the heart contained bloody fluid with small bubbles of air. The wall of the right side of the heart contained small bubbles of air. Embolism was undoubtedly the cause of death.

The writer adds reported cases of sudden death after this accident and death which developed more slowly. He reports a case of placenta previa in a multipara terminated by version. The child was expelled spontaneously but the patient suffered from severe hemorrhage, the placenta being removed very slowly and carefully; every effort was made to check the bleeding but death followed. Autopsy showed tympany of the ventricles, with the presence of air in the veins and a softened spleen. Bacteriological examination of the spleen showed the presence of some of the gas-forming bacteria.

Another case was that of a primipara, aged forty-one years, near term without dilatation but with very slight engagement of the head and in eclamptic convulsions. Immediate abdominal Cesarean section was

practised and there was some bleeding at the time of the operation, although not severe. After the operation the patient became conscious and had severe after-pains. She became restless and shortly after died. Air was found in the right ventricle and, on examining the uterus, it was found that one of the stitches had not caught sufficiently deep to close accurately the uterine wall, and there had remained an opening in the shape of a three-sided pyramid, in this a large sinus had opened through which air had entered. The patient died six hours after confinement and apparently air must have entered through the wound left by the imperfect closure of the uterine muscle.

The writer is skeptical of cases reported as deaths from air embolism unless they are proven by careful and accurate autopsy. There is no doubt that entrance of air in the site of the placenta is an exceedingly dangerous accident. When the uterus is not pregnant, if the pressure on the abdomen is negative and bloodvessels are open, there is also the danger of entrance of air. When a woman suffering from abortion or in labor or just after delivery, lies in the usual position upon the back, air does not enter the genital tract, provided the genital tract is in its normal condition and such a patient can turn with comparative safety and assume other postures.

When the hand is introduced into the uterus under these circumstances, the opportunity arises for the entrance of air and this is true when a large quantity of amniotic liquid is rapidly discharged. If air is introduced into the uterus of pregnant or recently delivered patients, under very considerable pressure, the pressure is greater than the normal intra-abdominal pressure, the placenta may be separated if it has not been expelled and opportunity is given for the entrance of air. This accident occurs when the uterus is relaxed, and not during labor pains when the uterine muscle is in state of contraction. The comparatively bloodless condition of the uterus favors the accident. To avoid this complication, vaginal douching and sudden change of position in parturient women which tend to produce the negative pressure in the abdomen, should be avoided. In treating placenta previa by combined version, the operator should use all gentleness, allow the spontaneous expulsion of the fetus if possible, and be careful to avoid sudden change of posture in the patient. This operation is one of the most frequent causes of this accident. The condition of comparative anemia and partial uterine relaxation present in these cases favor this occurrence. This operation must be considered as one of great importance and undertaken only by skilled operators.

LABOR COMPLICATED BY BROW PRESENTATION. Zimmerman¹ reports the case of a vigorous woman, aged twenty-nine years, who had had a spontaneous and comparatively easy labor. At the end of the second pregnancy, pains began by rupture of the membranes and the patient was brought to the hospital in labor, having been examined by a midwife and a physician. The patient had a somewhat flattened pelvis and the head had engaged, the greater fontanelle on the left side and on the right

¹ *Zeitschrift für Geburtshilfe*, 1921, **83**, 725.

the upper border of the orbit, the nose and upper portion of the face could be plainly felt. Heart sounds developed above the symphysis. The head slowly descended passed through a spiral revolution, the rotation of the trunk of the body being especially noticeable during the pains. Labor proceeded very slowly, the forehead gradually passed through the vulva with the eyes of the child directed toward the right side. The head was born by lateral flexion, the cord was over the right shoulder, the amniotic liquid was foul in odor, but there was no meconium, although abundant material from the child's skin. The perineum and pelvic floor was intact. The child weighed 4300 gm. and was 58 cc in length and was well developed. The shape of the child's head showed undoubtedly that the mechanism of labor had been the presentation of the brow. The posterior parietal bone had been pressed strongly underneath the apex of the occipital bone and on the right upper lip and cheek there was a very considerable lesion produced by pressure and another above the left ear, while upon the right parietal bone there was also evidence of severe pressure.

The interesting point in the development of the case was the effect on the descent, engagement and rotation of the head produced by the rotation of the body of the child. When the pains were stormy and the trunk and buttocks of the child could be seen to move and rotate, there occurred a corresponding rotation of the head, birth occurred in practically a transverse position of the head. The writer believes that the importance of the case lies in the demonstration of the marked influence of the descent and rotation of the buttocks and trunk in what is often considered a presentation where spontaneous birth is impossible.

LABOR DELAYED BY EDEMA OF THE CERVIX. Zweifel¹ describes the case of a multipara, aged forty-two years, who had an old laceration of the cervix; at labor edema developed to such an extent as to hinder the descent of the head and prevent the development of labor. The cervix was pushed up as far as possible, a tampon was introduced, the patient being in bed with the foot of the bed very considerably raised. When active labor developed the tampon was removed and a spontaneous birth followed. The edematous cervix prolapsed in the vulva but did not prevent the birth of the child. The patient's recovery was uncomplicated, but the anterior cervical lip still remained unduly large.

THE CONTROL OF POSTPARTUM HEMORRHAGE BY THE SEHRT AORTIC CLAMP. Becker² describes and illustrates the use of this clamp in the clinic at Kiel. The apparatus seems to consist of two portions, one a curved rest or cradle in which the trunk of the patient is placed, the other a clamp composed of two leaves, one of which is placed beneath the patient, the other is accurately fitted over the abdominal aorta. Anesthesia is not employed and pressure is made for ten to twenty-three minutes. The clamp is applied just above the umbilicus. The operator stands upon the left side of the patient and with his left hand feels the pulse in the aorta at the umbilicus and with his right hand tightens the clamp until this aortic pulse disappears, he then makes one or two turns

¹ Monatsschrift für Geburtshilfe, 1921, **52**, 20.

² Zentralblatt für Gynäkologie, 1921, No. 27, p. 965.

of the compressing screw still further. During this time the hemorrhage, the pulse at the umbilicus and pulse in the radial artery are carefully watched, the patient is told to breathe as quietly but with as short respirations as possible. While the clamp is in position pressure should not be made upon the uterus.

He describes 3 cases in which but a part of the apparatus was used, and 12 in which the entire apparatus was employed. Among his cases were patients having pyelitis, nephrosis of pregnancy, instrumental delivery, lacerations of the cervix and pelvic presentation and other minor complications. In these patients the use of drugs had failed to check the hemorrhage. No mortality was reported, nor was there excessive morbidity. Injury by the clamp could not be detected.

VESICAL CALCULUS AS A HINDRANCE TO LABOR. Ebbinghouse¹ reports the case of a patient, aged twenty-eight years, who had been twenty-four hours in labor, with very little progress. She had previously passed through a normal pregnancy and labor. In the present, there had been complaint of pain and distress referred to the bladder, and several irrigations of the bladder had been given without benefit. Labor began and the membranes ruptured, but progress ceased, and on the posterior wall of the symphysis there was a hard tumor larger than a walnut which was taken to be an exostosis or osteoma. As the attending physician feared rupture of the uterus, the patient was brought to the hospital. On examination, the genital tract was edematous and the veins in the region were distended. During uterine contraction, some urine was expelled. The head had come so far as to be visible during pains, with an enormous caput. On examination, the tumor was found behind the symphysis unquestionably preventing the expulsion of the child. Rotation of the head and the emptying of the bladder by catheter did not help. Some blood was withdrawn by the catheter. Under anesthesia, avoiding the distended veins in the anterior vaginal wall, an attempt was made to isolate and remove the tumor, this failed and the tumor seemed to be in the bladder. When the neck of the bladder was opened, a calculus 6 x 4.4 cm. was removed, the tissues were immediately closed by suture, birth of the child promptly followed and that of the placenta. A permanent catheter was placed in the bladder. Aside from a mild incontinence of urine which gradually subsided, the patient did well. She afterward returned with a small round fistula at the site of operation. This was operated upon successfully and the ultimate result was completely satisfactory.

The calculus weighed 30 gm. and was phosphatic. It has evidently formed in six or seven months.

The Mortality of the Fetus in Forceps Delivery. Lonne² contributes a considerable paper upon this subject. He contrasts the results obtained in the clinics of Heidelberg and Goettingen, in the latter of which he has made his observations. The frequency of the application of forceps varies from 1.35 to 2.9 per cent. The mortality of the children dying during labor was from 2.5 per cent to 3.08 per cent. Twenty-four hours

¹ Zentralblatt für Gynäkologie, 1921, No. 19, p. 676.

² Monatsschrift für Geburtshilfe, 1921, 56, 38.

after labor the fetal mortality was 0.72 per cent to 0.36 per cent. The writer takes the indication for the use of forceps when fetal heart sounds are less than 100 to the minute and the conditions are favorable for vaginal delivery with forceps. In 150 forceps operations the indications were in the mother's interest in 77, in the interest of the child in 70 and in 3 the interest of both mother and child. There was no maternal mortality and when the forceps were used in the interest of mother alone, 77 cases, there were 12 deaths of children. In the 70 cases where forceps were used in the interest of the child, there were 14 deaths of children.

The writer's statistics of high forceps operations would indicate that he applies the instrument at the pelvic brim, without waiting in some cases for complete moulding and engagement. As a rival of the forceps, he mentions Krysteller pressure by the hand. Where there is a suspicion of degeneration of the uterine muscle, it is evident that manipulation by the hand to force out the child must be highly dangerous. The writer has never seen severe injury done to the child's head by forceps and does not believe that the skilful use of the instrument produces such complications. He believes that in the use of forceps we should take a middle course between the radical and frequent operation and a conservative operation, which unfortunately may be done too late.

The Potter Method of Performing Version. Potter¹ states that during the previous year, he delivered 1113 women, of whom 920 were delivered by version. He describes and illustrates his method of operation.

Preparation is made as for any major operation. The operator's gown has short sleeves and he wears long rubber gloves reaching to the elbow. The patient is placed upon a table under surgical anesthesia and in a modified Walcher position. The legs are held by assistants, if possible, the bladder is completely emptied by catheter. The vagina and soft parts are dilated by one finger of the gloved hand lubricated with green soap, passing it as high as the cervix and withdrawing with steady and continuous pressure, then two fingers, and finally the closed fist is used until the vagina is thoroughly dilated. This can be done as well in primiparæ as in multiparæ. The cervix must always be obliterated or soft and easily dilatable before version is attempted, and this is generally accomplished by stretching with the fingers; and the hand and arm are carried high between the uterine wall and membranes and the latter are gently separated throughout their extent, avoiding the placenta. A towel is wrapped around the operator's wrist to prevent the rapid escape of amniotic liquid. The membranes are ruptured high up. The position of the child is made out and its probable size estimated, the position of the cord ascertained and the diameters of the pelvis estimated. The left hand is always used and both feet of the child are grasped; version is carefully performed and the child's feet drawn down to the vulva and delivered together. It may be necessary to make slight pressure, to lift the head out of either iliac fossa, with the right hand. Delivery continues until the knees are exposed, there is then a pause of a few

¹ American Journal of Obstetrics, March, 1921, p. 560.

moments when the withdrawn feet and lower legs are gently pulled upon until the pelvis of the child comes into view, the pelvis so rotates that the child's back is transverse to the pelvic outlet. If the cord is free and loose, no attention is paid; if it is tight and short, a clamp is placed at the umbilicus and, if the cord cannot be loosened, it is cut. The scapulæ are then thoroughly exposed before an attempt is made to deliver the shoulder. The fingers and hand of the operator are pushed well above the shoulder between the lips of the vulva, and the anterior shoulder is delivered with the upper arm. The operator next grasps the child with his hand over the exposed shoulder and chest and rotates the child's body so that the posterior arm becomes anterior and is delivered as such. Both shoulders now being delivered, the lower arm usually follows of itself or is gently lifted up across the chest of the child and drawn away from the perineum under the pubic arch. The older method brought down the posterior arm across the distended perineum frequently producing extensive tears. If the cord is twisted about the neck, it must be loosened, or clamped and cut; if it is free, it requires no interference. The fingers of the left hand are then inserted into the child's mouth and with the right hand gentle pressure is made over the occiput above the pubis, care being taken to avoid pulling down the jaw. When the child's mouth is exposed, the mucus is milked out of the throat by the fingers passing down the neck, respiration then begins and the child cries. The child is left in this position, allowing time to thoroughly dilate the perineum and the vagina. Haste should be avoided and finally the nose is delivered followed by the brow in an extremely flexed position, the cheek of the child being lifted well forward and up from the perineum. The child is placed upon the right side upon the mother's abdomen and remains there until the cord ceases to beat, the cord is then tied and cut, and a hypodermic injection of 1 cc of pituitrin is given deeply into the muscles of the thigh of the mother. If the placenta is not delivered in fifteen to twenty minutes, it is extracted manually by the gloved hand, a binder is applied and the patient is put to bed.

Potter states that the purpose of the operation is to eliminate the second stage of labor thus relieving the patient of pain and agony. The cervix must be obliterated, the os dilated or dilatable, the position of the presenting head is of no importance. Version can be done if the head can be lifted above the pelvic brim. If the head is wedged in the pelvis and the amniotic liquid has escaped, version is impossible. It is essential that both feet be brought down at the same time. The scapulæ must be outside the vulva before an attempt is made to deliver the arms, when the anterior arm should be first delivered. After the umbilicus comes into view there should be no haste. The perineum and pelvic floor of the mother are saved by deep anesthesia, by the partial Walcher position, by previous dilatation of the parts and slow and careful delivery. Manipulation of the child after birth is avoided, and spontaneous respiration rarely fails. When the mouth is exposed, the child's body is raised to permit the expulsion of mucus. It must always be remembered, in the delivery of the head, that extreme flexion is necessary, too great pressure on the mother's abdomen must be avoided for fear of injuring

the bladder or lower uterine segment. Occasionally, the after-coming head requires forceps. Before actual version is attempted, the operator must thoroughly explore and clearly make out the position of the child in the uterus, this can only be done by introducing the hand to the fundus.

The writer has never broken the extremity of a living child during birth; on three occasions the humerus was fractured in dead children where haste was imperative in the interest of the mother. The writer avoids the use of bags believing that they displace the presenting part and predispose to prolapse of the arm. He states that in all he has delivered by version 2900 cases. He has had no postpartum hemorrhage in his experience.

Among the 1113 women, 920 were delivered by version, 400 primiparae and 520 multiparae. Among the whole number 80 abdominal Cesarean sections, 2 vaginal Cesarean sections, 39 instrumental deliveries, 2 cases of application of forceps to after-coming head, 12 cases delivered themselves before the physician arrived, and 10 were delivered as vertex cases. There was 1 craniotomy. There were 41 stillbirths. Two mothers died who had been delivered by version, 1 a poorly nourished patient who had colitis with fever a week before delivery and lived forty-one days after delivery. Blood cultures for three weeks following birth of the child were sterile. The second patient was convalescent and about to leave the hospital when she developed a lobar pneumonia.

Since the publication of this paper the writer has reduced his fetal mortality considerably and has defended his operation on several occasions when it has been exposed to criticism.

Rucker¹ describes his experience with this method of version. He believes that it can be taught successfully to students and that it is easier to teach than the use of forceps. In his experience, it protects the mother from lacerations and to get the best results for the child should be done gently and deliberately. A competent anesthetist is essential.

The Use of Kielland Forceps. Riedieger² and Meyer³ report their use of Kielland forceps. They are unaware that this instrument is familiar to other than German obstetricians. The writers describe it as a decided improvement over other forms of instruments. They do not illustrate their papers, so it is difficult to obtain an idea of the details of the instrument. They quote considerable German literature on the subject. The indications for the use of these forceps are those commonly recognized in the use of other varieties.

Missed Labor, with Rupture of the Symphysis. Shroeder⁴ describes 3 unusual cases of labor, 1 a primipara, aged thirty-four years, who came into labor with head high at the pelvic entrance. Pains gradually developed and there was abundant discharge of amniotic liquid. The child's head was transverse. Examination under anesthesia showed an

¹ American Journal of Obstetrics, March, 1921, p. 574.

² Monatsschrift für Geburtshilfe, Band 55. Heft 2 and 3, August, 1921, page 113.

³ Ibid., 1921, No. 43, p. 1557.

⁴ Ibid., 55, 103.

apparently roomy pelvis. The conditions were somewhat unusual and suggested a double uterus. Labor did not proceed. The patient's temperature rose and pulse and respiration increased in frequency. The child's heart-sounds were 120. The uterus had evidently become infected and an effort was made to hasten labor by introducing a dilating bag and by giving a preparation of pituitrin by intramuscular injection. The dilating bag was expelled into the vagina in four hours and pituitrin was then repeated, although it produced no efficient pains. A difficult forceps application was made and, on traction, the forceps slipped, the cord prolapsed and was pulseless; accordingly, craniotomy was performed although this proceeded with considerable difficulty. As craniotomy was not successful, the forceps again was applied and very considerable force exerted when the head was brought into the pelvic brim, held in position by the forceps and craniotomy successfully performed, the uterus was irrigated and an extensive laceration was closed. The child weighed 4410 gm. and was evidently over term. The history showed that the patient had had a chronic peritonitis and this had undoubtedly rendered the action of the uterus unsuccessful. The patient made a fairly good recovery although there were adhesions about the uterus.

He also describes the case of a patient, underdeveloped and poorly nourished, with an abdominal tumor and with a brownish vaginal discharge. On exploring the uterus, a very fetid, abundant secretion was present. The pelvis and tumor were elevated, labor pains were brought on and gradually the bones of a fetus were delivered and the uterus finally emptied of a dead and decomposed fetus and considerable very foul gas. The patient had severe shock, but gradually rallied. She finally made a good recovery.

In the case of a primipara, the forceps were applied and the child delivered without apparent great force. On examining the genital canal after delivery, which had occupied twenty-three minutes with forceps, it was found that the vagina had been separated from the urethra and that the bony tissues of the symphysis could be felt at that point, with fracture two or three finger widths. The child died a day and a half after delivery, the mother made a fairly good recovery, with union of the symphysis and considerable callus.

Cesarean Section. The *Journal of Obstetrics and Gynecology of the British Empire* devotes No. 3 and 4, 1921, autumn and winter issues, almost entirely to discussion of Cesarean section.

Kerr writes upon its indications stating that the weakness of most operations, as at present performed, lies in the fact that operation leaves behind a uterus permanently injured and liable to rupture in subsequent pregnancy. In general, he believes that all deliveries should be carried out in hospitals or nursing homes, for never in private houses can any obstetrical operation be carried out as satisfactorily. It is impossible to make the practice of obstetrics too surgical because in the management of normal labor the first essential is surgical cleanliness.

For contracted pelvis, he recognizes a clear indication for section in a large number of cases. If contraction is at the outlet only, pubiotomy

is especially suitable. The induction of labor does not come into competition with Cesarean section. In suspected and septic cases, he believes we could obtain better results by a very thorough disinfection of the vagina and cervix.. If section is done in these cases, the placenta should never be removed through the uterine wound, but should be delivered through the vagina. In fibroids, section should be done if the tumor is present obstructing the passage of the child from the uterus, and on no account should the child be pulled past the tumor. In ovarian cysts, the tumor should be removed and the child delivered by the natural passage. Cesarean section for eclampsia is of very limited application. When pregnancy is well advanced, with no attempt at labor or dilatation of the cervix, and when after six hours there is no improvement from blood-letting and morphine, section may be done. Vaginal section is indicated when eclampsia develops early, within the thirty-second week. Placenta previa is peculiarly suitable for Cesarean section, and he believes that it may come to be the general method of treatment of central and marginal varieties. In the lateral variety the rupture of the membranes and a slight separation of the lower pole of the placenta will be sufficient. In central placenta previa in a primipara, Cesarean section should always be selected.

In accidental hemorrhage, Kerr would keep the patient quiet, wrapped up in hot blankets, give morphine and when labor pains begin, give pituitrin, in few cases would he do section. When the uterus has been fastened into an artificial position and pregnancy and labor occur, section is often indicated. Under some conditions, prolapse of the cord or impacted shoulder presentation might furnish an indication. The judgment of the obstetrician must be exercised in each case where there is an overgrown child, a contraction or retraction ring in the uterus, rigidity of the cervix or pelvic floor and some grave disease threatening the life of the mother.

Kerr practises most Cesarean sections through the lower uterine segment by transverse incision, believing that a better scar can be secured than with the ordinary longitudinal incision. His method he clearly illustrates. He closes all muscular tissue with linen or fine silk, sutures the uterus while it is in a state of retraction, as distinguished from that of contraction, and delivers the placenta through the vagina. When incising the uterus, a suture is inserted at each end of the wound which prevents the incision from tearing and after delivery enables the operator to pull up the wound so that it can be easily stitched. Catgut is used for the mucous membrane, linen thread for the muscles and a third layer of catgut for bringing the bladder back to its old position. He has done this operation in 22 cases, with 1 fatality. There has been 1 spontaneous delivery after the operation and 4 repeated sections.

Holland writes of the results obtained by the classic section. He has collected the statistics of about 4000 operations by British obstetricians. With the patients not in labor, the maternal mortality was 1.6 per cent; early in labor the maternal mortality was 1.8 per cent, late in labor the mortality was 10 per cent, after induction of labor 14 per cent, and after attempts at delivery by forceps or craniotomy, 27 per cent.

The classic section is dangerous in infected or septic cases, leaves a scar which may subsequently rupture, may be followed by intestinal complications and by the development of adhesions. He first incises the peritoneum only, reflecting it a half inch all around, the muscle is then incised and in closing the wound the muscular wall is sutured first. The reflection of the peritoneum allows the needle to be inserted outside the edge of the muscle to secure a firm hold. The peritoneum is united by a running suture and over that a Lembert suture. The operator should wait for retraction. Silkworm gut is the best suture material, silk next, and cutgut worst. He believes the incision through the lower segment promises well and should be employed except when the lower segment is hard to reach, as in cases of shortness of the abdominal cavity with diminutive stature, when the presenting part is jammed down against the pelvic brim or in fibroids. This method seems well adapted to patients who have been long in labor where infection is to be feared.

Holland also publishes in this number an extensive paper on the results of Cesarean section in Great Britain and Ireland from 1911 to 1920 inclusive. The statistics are obtained from the leading hospitals. We have already quoted those where the classic operation was done for contracted pelvis, in 3372 of these cases the maternal mortality was 4.1 per cent. There were 46 cases of Cesarean hysterectomy, with 8 deaths. These were complicated cases. There were 33 cases of operation through the lower uterine segment; 12 extraperitoneal, with 4 deaths; 20 transperitoneal, with 1 death. With a most liberal allowance, the true mortality of Cesarean section after the application of forceps alone, is 25.8 per cent. In operations for contracted pelvis the fetal mortality was 3.9 per cent and a later mortality among the survivors of 4.2 per cent.

Where Cesarean section is done for eclampsia, there was a maternal mortality of 32 per cent, and a total mortality among eclampsia and other toxemias for the children of 50 per cent. He gives a classification of toxemias adopted by English writers which is not intelligible to the reviewer. In one group is placed eclampsia and in another albuminuria, chronic nephritis, pernicious nausea, and severe toxemia.

There were 139 operations for placenta previa, with a maternal mortality of 14 per cent; in central placenta previa, 9.3; in incomplete and what is termed placenta previa 18 cases, with 1 death. The fetal mortality 7 per cent, the infant mortality 22.3 per cent. In accidental hemorrhage, Cesarean section gave a mortality of 11 per cent and Cesarean hysterectomy of 46.6 per cent, evidently the hysterectomy was reserved for the gravest and almost fatal cases. In this complication, the mortality for the children was 86 per cent. Among his collection are 366 operations done for obstruction or prolonged labor, grave disease threatening the mother, abnormalities of the fetus, rupture of the uterus. These cases are described in detail and it is impossible to obtain, by comparing them, the maternal death rate or particular indication. The result in each case was decided by the individual case; 63 pages of tables conclude his interesting and valuable paper.

THE LIMITATIONS OF CESAREAN SECTION. Blacker, whose paper summarizes what is the experience of all operators who have had a considerable trial of the operation, as regards placenta previa believes Cesarean section is justified when the risk to the mother can be reduced to a figure corresponding to that obtaining when these cases are treated by the older methods. There is, however, a small select class of cases in which the operation should be preferred.

Blacker's experience has been in the obstetric wards of the University College Hospital, and he believes that there is some ground for the view that Cesarean section is being resorted to needlessly and in a large number of conditions in which it is not really necessary; and that the time has come for a protest on behalf of those teachers who still believe that many of these cases can be properly and safely treated by a skilled obstetrician without resorting to abdominal section.

Bride gives his experience in Manchester, and Whitehouse writes of Cesarean section for placenta previa in the hospital at Birmingham. He believes that the majority of opinion is now in favor of Cesarean section for placenta previa in a greater number of cases than formerly. He would not propose the operation when the placenta is marginal and when delivery by other methods will give good results. If the patient has had such severe hemorrhage that the child is moribund, Cesarean section should be declined. He would reserve the operation for those cases causing symptoms from the eighth month on, and when the first hemorrhage has not been so severe as to risk the viability of the child.

Alluding to the results obtained by other methods in his hospital, 317 cases were studied, with maternal mortality of 5.6 per cent, gross fetal mortality 77.2 per cent. Eleven different methods of treatment were employed during this time. Version was done more frequently than any other operation, with a maternal death rate of 4.2 per cent, fetal 71.4 per cent; spontaneous labor had no maternal death rate, fetal death rate 45.7 per cent. The use of the dilating bag had a maternal mortality of 20 per cent, fetal death rate 73.3 per cent. During the first three years in accordance with the indications studied, the writer performed Cesarean section for placenta previa in 9 cases with no maternal mortality and the birth of 11 living children, all of whom were alive and well one month after the operation.

Holland contributes a paper on RUPTURE OF THE CESAREAN SCAR, of considerable length, which should be studied in detail by obstetricians. It contains detailed reports of five cases, with illustrations. His conclusions are valuable.

The frequency of rupture of the Cesarean section scar in subsequent pregnancies and labor excluding abortions, is 4 per cent; imperfect healing is the usual cause. A thin scar will burst from intra-uterine tension, uterine contraction, or insertion of the placenta over the scar, with partial separation and hemorrhage; overdistention of the uterus, difficult labor, operative interference and pituitrin predispose to rupture. Rupture occurs almost as often during pregnancy as during labor, in proportion 3 to 4 and may occur as early as the seventh month. Infection is a great cause of imperfect healing. Catgut should not be used,

for liability to rupture after catgut is two and a half times greater than silk, theoretically silkworm-gut is the best. The most dangerous scar is that made by transverse fundal incision, there has been one case of rupture of the scar reported in the cervical incision.

Banister, of Queen Charlotte's Hospital, writes on *CESAREAN SECTION IN INFECTED AND OBSTRUCTED CASES*, reporting nine. He is not pessimistic about Cesarean section in these cases and believes the classic operation is best. He disinfects the genital tract very thoroughly, including the abdominal surface, turns the uterus out of the abdomen and swabs out the interior of the uterus as thoroughly as possible. He closes the muscle with linen thread or silk.

Blair Bell draws attention to the importance of disinfecting very thoroughly the uterine cavity and cervix with antiseptic gauze, and on one occasion used a gauze pack soaked in strong sodium hypochlorite solution. He also describes his method of closing the wound and illustrates it.

Johnstone describes his method of suture, and Gandy writes concerning the use of anesthetics for Cesarean section. He uses various methods and different anesthetics, for it is his experience that chloroform induces a flabby condition of the uterus while with ether the uterus contracts more readily and less blood is lost. Stovain does not interfere with the contraction of the uterus.

Berkeley performs *CESAREAN EXTIRPATION OF THE UTERUS FOR PREGNANCY COMPLICATED BY CANCER*, 232 mg. of radium bromide having been used twice as an application to the cancerous cervix during the pregnancy. Seven years and five months after the operation the mother was well, as was the child. On delivery, the child had two bald patches on its head, corresponding to the position of the radium which had been in the cervix, a year afterward the bald patches had disappeared. He also describes Cesarean section for a bad condition of the heart, and removed the Fallopian tubes at the operation. The recovery of the mother and child followed.

Rebert reports *CESAREAN SECTION FOR TOXEMIA OF PREGNANCY, CONTRACTED PELVIS AND TRIPLETS*, in one patient with success.

Fothergill did a successful operation for a prolonged pregnancy of three hundred and forty-four days. The child was a monster. This patient became pregnant again and a finely developed child was delivered by a second section, the uterine scar being sound.

Macleam had a death from *POSTPARTUM HEMORRHAGE AFTER CESAREAN SECTION*. Forceps had twice been applied by the attending physician. The patient had contracted pelvis and was severely shocked at the time of operation. One hour after delivery, the uterus suddenly relaxed and a fatal hemorrhage occurred; the child recovered.

Shaw performed *SECTION FOR SLIGHTLY CONTRACTED PELVIS* combined with recto-vaginal fistula, with success. He also reports the seventh operation on the same patient, the uterus being sutured with catgut on each occasion.

Lisle performed six sections successfully on the same patient. Smith had a successful operation for *MISSED LABOR*. Johnstone for *TWIN*

MONSTERS and also for advanced CANCER OF THE RECTUM, and Luker made a Cesarean section for INCONTINENCE OF URINE. This condition followed a previous delivery by cephalotripsy and severe lacerations; it was not thought best to risk delivery through the vagina, under the circumstances.

Luker did a successful operation for GRAVES' DISEASE AND CONTRACTED PELVIS, and also for ankylosed hip, while Roy, while serving in the navy, was called in consultation in the case of a dwarf primigravida. She was seen at her cabin in the Orkney Islands, with highly contracted pelvis and dead child. She was taken aboard the hospital ship with considerable difficulty but, fortunately, favored by fine weather. A subtotal hysterectomy was performed, the ovaries and tubes being left, the patient making a good recovery and going home on the fourteenth day. This is the only recorded case of Cesarean section performed by the Royal Navy Medical Service.

Roy also describes two cases of INFECTION OF THE UTERINE WALL IN STITCHES THAT HAD BEEN USED IN CESAREAN SECTION. One patient died of pulmonary embolism and on examination stitches were found to be infected. The second had had a Cesarean section previously and was operated upon for chronic infection following the first section.

Dougal performed the operation successfully for LABOR OBSTRUCTED BY ADHESIONS and also for labor obstructed by a non-gravid horn of a double uterus.

Robinson for UREMIA, White for OSTEOMA OF THE BROAD LIGAMENT AND FOR DOUBLE LOBAR PNEUMONIA FOLLOWING INFLUENZA, using spinal anesthesia. Also for twin pregnancy complicated by intolérable pain.

Bourne performed two operations for CONTRACTION RING, and Phillips for UTERUS BICORNIS and Whitehouse SACCULATION OF THE UTERUS, while Oldfield reports a POSTMORTEM SECTION. An interesting discussion of all these papers ensued.

Martin,¹ before the Glasgow Obstetrical Society reported 50 consecutive Cesarean sections without fatality. He follows the method employed by Cameron, turning the uterus inside out to remove the placenta, this kinks the uterine arteries and stops the loss of blood, the wall of the uterus was thoroughly rubbed with gauze, the lowest suture is inserted first before the uterus was reinverted, the stitches were interrupted, of silk.

Copeland,² of Toronto, has had twenty-nine operations without operative mortality, and describes at considerable length his method of operating. The uterus is not drawn out of the abdomen and the muscle is closed with chromic catgut. Pituitrin is given as soon as the uterus is emptied, and a running suture is used for closure.

Jones³ would have Cesarean section performed more frequently; with the view of making a better scar he makes a gridiron incision. A large strip of gauze wrung out of solution is packed between the uterus and

¹ British Medical Journal, April 30, 1921, p. 641.

² Journal of the American Medical Association, August 6, 1921.

³ British Medical Journal, July 16, 1921, p. 75.

anterior abdominal wall, completely around the incision. The external muscle layer is incised transversely and the superficial layer is incised along this track, the muscle is then pulled up, exposing the middle line, the bleeding points are ligated, and the middle and inner layers incised longitudinally followed by delivery. The uterus is turned inside out, inspected and closed.

THE TWO-FLAP LOW INCISION, CESAREAN SECTION. Beck¹ operates by exposing the uterus through a transverse or midline incision below the umbilicus. The peritoneum is incised transversely about 2 cm. above the bladder, and the inferior flap is obtained by stripping the bladder off from the anterior surface of the uterus. The upper flap is made by gently passing a pair of scissors under the peritoneum. The two flaps are retracted and, in the denuded area, the uterus is incised in the midline. The child is extracted by using one hand as a vectis and pressing down on the fundus, using forceps if necessary. A catgut traction suture is passed through the lower angle of the uterine wound and another at the upper angle to keep the uterus from sinking into the pelvis, and the placenta and membranes are separated and removed. If possible, they are passed through the cervix into the vagina. The first line of interrupted sutures pass through the entire uterine wall down to the endometrium; the second goes only through the outer half of the muscle wall, each suture in the latter or superficial series is placed midway between the deep ones. The upper peritoneal flap is brought down over the superior portion of the closed uterine incision and secured by several interrupted sutures. The remainder of the denuded surface is covered by bringing the lower flap about 1 cm. above the original incision, thus lapping the peritoneal folds and sealing the wound in the uterus. By this the writer claims that the double flaps of the peritoneum are a protection against the spread of infection, protecting the peritoneal cavity from contamination. There were 29 cases, done by four operators. In 8, there were signs of infection after the operation. Many of these patients had been repeatedly examined and were septic cases.

The writer believes that this operation is especially suitable for borderline cases after the test of labor, in place of an elective Cesarean section. In the 29 cases, he states there was no mortality.

Schiffmann,² in the Latzko Clinic in Vienna, gives his experience in Cesarean section as a method of prophylactic delivery in multiparous patients who have previously lost children in difficult labor. He considers the operation from the prophylactic standpoint. His experience shows that if the woman has had several labors with adequate medical attention but with the loss of the child, and if she comes to the age when conception may not again occur and that it is especially desirable to save the life of the child, if she is in good condition and not infected, Cesarean section is justifiable in view of her former experience.

The reviewer shares the view expressed by the writer, and some of the most satisfactory results which he has obtained in the operation have been in these cases.

¹ Surgery, Gynecology and Obstetrics, September, 1921, p. 290.

² Zentralblatt für Gynäkologie, 1921, No. 49, p. 1527.

THE RESULTS AND INDICATIONS FOR CESAREAN SECTION. Essen-Möller¹ gives his results in 106 Cesarean sections in the Hospital at Lund, Sweden. There were 10 operations for premature separation of the placenta and eclampsia, 3 mothers dying from eclampsia. The writer believes that operation should be limited to those cases where vaginal Cesarean section is exceedingly dangerous because the woman is primipara with contracted vagina and cervix. There were 7 operations for placenta previa and 1 death from embolism, and the writer would perform the operation in these cases when infection was absent. A decisive hemorrhage had occurred and the conditions were not favorable for version. He operated 8 times for pregnancy complicated by fibroids, with 1 death from ileus; 74 operations were done for contracted pelvis, with 1 death from peritonitis. He would decline high forceps, version or craniotomy in difficult labor if the mother was not infected. If she was infected, he would perform vaginal delivery by one of these methods rather than subject the mother to the risk of Cesarean operation. The Porro operation is indicated when undoubted infection is present. Seven operations were done for stenosis of the vagina and other rare indications.

In discussion, Brandt, Bjorkenheim from Helsingfors, Lundblad, Hauch and Petersen reported cases. All spoke of the extending of the indications for operation and the results were practically those obtained by other operators. Lundblad had 6 cases of extraperitoneal section with Latzko's method. He succeeded in performing the operation entirely extraperitoneally. The bladder was wounded in 2 cases. The patients made good recoveries.

RUPTURE OF THE UTERUS, COMPLICATING CESAREAN SECTION, IN THE SCAR OF A PREVIOUS OPERATION. Hillis,² reports the case of a negress who had two spontaneous deliveries and one section. She was admitted to the hospital in a subsequent pregnancy with the uterus in tetanic contraction, at term. There was extreme tenderness over the abdomen and the fetal parts could not be made out. The patient was in shock and had no labor pains. Pulse 144. Morphine was given and an hour later a diagnosis of threatened uterine rupture was made. Blood appeared at the vulva. On opening the abdomen, there were adhesions and free blood. The anterior wall of the upper part of the uterus was normal, but at the junction of the lower uterine segment a tear was found extending from a little to the right of the midline toward the left into the broad ligament. In the left broad ligament was a hematoma the size of a fist, through this opening the hand passed readily into the uterine cavity where the fetus could be felt; no Cesarean section scar was found on the anterior wall of the uterus. An incision was made in the anterior wall and a dead child removed, a contraction ring just above the lower segment holding the child firmly. The child weighed about eight pounds. An accurate history could not be obtained, the pelvis was not contracted, nor could a sufficient reason for the rupture of the uterus be found. The interesting point is the fact that the uterus did not rupture through the Cesarean scar.

¹ *Monatsschrift für Geburtshilfe*, 1921, **54**, 121.

² *Surgery, Gynecology and Obstetrics*, June, 1921, p. 567.

In the Maternity Department of the Jefferson Hospital a patient was admitted from the dispensary service with symptoms of threatened rupture of the uterus, she had had a section previously. When the abdomen was opened the second time, the uterus had ruptured at the fundus while the scar lower down in the anterior uterine wall held firmly and was not thinned. A portion of the child was projecting through the rupture. The child was dead, the mother recovered after hysterectomy.

There can be no question of the fact that under some conditions the Cesarean section scar may be stronger than the remaining portions of the uterine wall.

PUERPERAL PERIOD.

Puerperal Septic Infection. Rice¹ reports two cases of puerperal sepsis complicated by gangrene of the extremities. The first patient had gangrene of both lower extremities, with ecchymoses on the cheek and buttock. The left arm was painful and right arm cold. The patient died, her condition not justifying operation.

The second patient had apparently a double thrombophlebitis, but gangrene developed in the left ankle and foot, amputation was done through the calf, and the leg was found riddled with pus. It was freely drained. The patient finally made a tedious recovery.

That influenza may cause thrombophlebitis during the puerperal period is reported by Smead.² He reports three cases occurring during the epidemic of influenza. The patients recovered.

Abernetty³ draws attention to what he considers a most important clinical phenomenon in the first five days of the puerperal period. He has been especially interested in the leukocytosis which accompanied or follows labor. He calls attention to clinical observations and experiments illustrating this point. He believes that as soon as labor begins small vessels are ruptured, and the blood so extravasated is reabsorbed into the tissues of the uterine wall. This produces sufficient irritation to cause a free formation of leukocytes.

Leukocytosis is higher in primiparæ than in multiparæ because the wounds are greater in first, than in other labors. Lactation, he believes has little, or no, influence on this phenomenon for lactation causes only subjective disturbances. In his experience, 34 per cent of his patients had subjective disturbances of various sorts during the first five days of the puerperal period, 12 per cent had pains in the breasts, 2 per cent in the axilla, 4 per cent pain in breasts and sacrum, 6 per cent had pain in breasts and chilly sensations without fever, 2 per cent had slight chills alone, 4 per cent had pain in the axilla without chills, and 4 per cent had pain in the sacral region with no other phenomena.

THE EVER-PRESENT QUESTION OF WHAT CAN BE DONE TO LESSEN PUERPERAL SEPTIC INFECTION is raised by Schmitt.⁴ He takes as his material for study, the second 10,000 cases in the Clinic at Würzburg.

¹ American Journal of Obstetrics, November, 1921, p. 560.

² Ibid., p. 447.

³ Monatsschrift für Geburtshilfe, 1921, vol. 54.

⁴ Zeitschrift für Geburtshilfe, 1921, 83, 335.

This material embraces nearly all of the obstetric complications. The septic mortality in the 10,000 cases was 0.15 per cent, or 15 cases, of whom 5 became infected in the hospital. One of these at autopsy showed that the infection was not puerperal, but originated in the tonsils and intestines.

The second patient had infected lymphatics at the time of labor. The third was in labor forty-eight hours and was examined eleven times by nine different physicians and students. The fourth patient had manual removal of the placenta followed by irrigation and packing with gauze and the development of pyemia fourteen days later. The fifth case had postpartum hemorrhage, was examined twice during labor, had a necrotic endometritis and general sepsis. This leaves 3 in 10,000 unquestionably infected in the hospital; 1 after manual removal of the placenta, and 2 after spontaneous labor.

He then takes the statistics of 20,000 births with 24 puerperal infections resulting fatally, of whom 9 had become infected in the hospital. The first 4 arose from tamponing the uterus without careful preliminary cleansing, manual removal of the placenta, septic infection before labor which was terminated by forceps, and gonorrhea preceding labor. This leaves 3 in 20,000 infected after spontaneous labor, of whom 1 had gonorrhea before labor.

This is considered as practically as good a result as can at present be obtained.

The writer now has abandoned vaginal douching, but practises the strictest cleansing of the external genitalia. The writer believes that with strict external antisepsis and use of rubber gloves maternity hospitals are safer for parturient women than the ordinary dwelling and ordinary obstetric practice as conducted.

The British Medical Journal, 1921, page 701 contains an Editorial on PREVENTION OF PUERPERAL INFECTION. It is based on the report of the Registrar General and on some recent English papers upon the subject. The editorial states that the present mortality in England and Wales, outside hospitals, is about 2 in 1000 confinements, every year. An important question is what shall be done in the way of preliminary treatment against infection. The essential thing is the most thorough and strict cleanliness of the external parts, including shaving and rigid surgical disinfection of the vulva and tissues about the anus. The rectum should be emptied by irrigation, vaginal examinations or other interference should be limited to absolute necessity. The same precautions must be taken in labor which are taken in every pelvic operation.

It is interesting to note that by the will of a physician the Royal Society of Medicine offers a Testimonial prize of 250 pounds for the best contribution on the cause and prevention of death in childbirth from septicemia.

TWO CASES OF ERYSIPELAS OF THE PUERPERAL BREASTS are reported by Rating.¹ The first patient was a primipara, the erysipelas developing on the fifth day after labors causing two abscesses containing virulent

¹ Monatsschrift für Geburtshilfe, 1921, 55, 129.

streptococci and spreading from the breasts to the arm and thorax and the lower portions of the body. The patient was ill for thirty-six days but recovered.

The second patient had given birth to her second child and on the seventeenth day of the puerperal period had mastitis followed by erysipelas of the breasts, on the eighteenth day of the disease there was metastasis to the lower lobe of the right lung, abscess did not form but the patient made a tedious recovery. There is reason to believe that infection in at least one of these cases came from a patient suffering from an infected throat.

THE TREATMENT OF PUERPERAL INFECTION. McCann¹ urges prophylaxis and strict surgical principals of antisepsis. He would avoid rectal examinations, cleanse and immediately close all tears of the cervix, pelvic floor, vagina and perineum. In infected cases he would first search for foci outside the genital tract. He would explore the uterus when there was an absolute indication, using a blunt curette as a probe and not as a scraper. When puerperal peritonitis arises, it should be treated on surgical principals, subcutaneous salines, purgation, and quinine are useful. Sera and vaccines in his experience were disappointing.

In discussion, uterine drainage was done through a small rubber catheter with injection of 10 cm. of glycerin and iodine 7 to 1.

Fothergill² would not entirely abandon the curette in the diseases of women. He considers it a diagnostic instrument. In incomplete abortion and in the very first stages of acute septic endometritis, a large curette should be used for emptying and cleansing the uterus with positive advantage. Following the use of the curette the uterus should be swabbed and not irrigated, and no douche afterward should be given. A concentrated antiseptic should be used for this swabbing.

Human serum is recognized in the treatment of puerperal sepsis by Bartram.³ The best is that obtained from pregnant patients or those convalescing from a septic process. The effect of the serum is to increase the production of proteins and probably to bring about a specific immunity. There is no danger of anaphylaxis by this method. It can usually be carried out conveniently and efficiently in any maternity hospital having a considerable service. The serum is obtained from blood freshly drawn by the centrifuge and given in 15 to 50 cc doses by intravenous injection, when the veins are not so collapsed that it cannot thus be given. This dose is usually repeated daily.

Turpentine in Treating Puerperal Sepsis. Hermstein⁴ injects 1 cc of a 20 per cent solution of refined turpentine in olive oil, making the injection beneath the periosteum of one of the pelvic bones. To make the treatment less painful, he often adds 0.2 per cent of novocain. More than three injections are not given, although, in some prolonged cases of pyemia, he has used as many as seven. In patients greatly prostrated, he also uses camphor subcutaneously.

¹ British Medical Journal, December 17, 1921, p. 1036.

² Lancet, January 8, 1921, p. 51.

³ Zentralblatt für Gynäkologie, 1921, No. 15, p. 529.

⁴ Ibid., No. 19, p. 683.

Bauerisen¹ has seen good results follow the colloidal preparations of silver called *trypaflavin* and *yatren*. He employed the colloidal silver in pyemia, severe sepsis, peritonitis and pelvic peritonitis, using argo-chrome in some patients. Trypaflavin belongs to the group of color material which is a combined chemical. It has a strong action in destroying bacteria in solution of 0.5 to 1 per cent which is injected in 10 to 15 cc.

Yatren is a compound containing benzol and iodine. It has been tried in various septic conditions in doses of 5 cc of a 10 per cent solution given intravenously. In place of iodoform gauze, yatren gauze has been used for various purposes in the clinic and unquestionably it has a considerable action upon bacteria.

Becker² has made observations in the endeavor to discover why bactericidal substances produce their effect when given intravenously. Among other experiments he had a patient, aged twenty-nine years, suffering from septic infection following abortion. In 5 cc of venous blood he found 8 colonies of hemolytic streptococci; during the next twenty-four hours the patient was given 120 cc of primaflavin by intravenous injection. Five cc of blood was then found to contain 80 colonies of bacteria; 20 cc of primiflavin was then given and the patient had an intensely yellow color. During the next two days the bacteria in the blood increased and on the twelfth day the patient died.

A study of the blood and photographs taken after the injection showed that this substance had no action directly upon the bacteria. When they produce a result, it is because they replace or exceed the immunizing properties always in the blood.

Dakin Solution has been used by Hellendall,³ in the treatment of puerperal infection. During the recent war the writer treated 128 cases in military surgery, with 10 per cent solution. From his surgical experience he has been led to treat cases of abortion complicated by fever with 0.5 per cent Dakin's solution. In those cases of incomplete and septic abortion, a thorough evacuation of the uterus, irrigation with from 1 to 3 pints of 0.5 per cent Dakin's solution was followed by rapid disappearance of the fever. In several cases, where there was retained and infected placenta, results were excellent. In a case of contracted pelvis repeatedly examined by a midwife, and after a physician had tried to deliver by forceps, the patient being in labor ten hours, and having three doses of pituitrin given, the child was finally delivered by forceps after episiotomy. The placenta and amniotic liquid were foul in odor, the lochial discharge was foul and there was fever for several days, but, after an irrigation with Dakin's solution, the patient recovered.

THE NEW BORN.

Syphilis in the New Born. Brown,⁴ in 200 cases of stillbirth, observed 35 in which death was due to syphilis; of these, 21 died before birth.

¹ Zentralblatt für Gynäkologie, 1921, No. 34.

² Ibid., No. 34, p. 1218.

³ Ibid., No. 24, p. 866.

⁴ Journal of Obstetrics and Gynecology of the British Empire, 1921 28, 153.

The Wassermann reaction was strongly positive in 5; negative in 7; not obtained in 7 others, doubtfully positive at the fifth month in 1, twice negative before birth in 1, doubtful from the cord and positive eighteen days after birth. A detailed statement is given of the pathology of these cases, with microscopical illustrations and cases tabulated. A conclusion is reached that of 200 cases of stillbirth, syphilis was the cause of death in 17.5 per cent; with a suggestive history, disregarding the Wassermann reaction, though negative, a diagnosis should be made and the mother treated accordingly. A positive Wassermann reaction is very significant, and a negative of little value. In cases examined not having undergone adequate treatment during pregnancy, at postmortem there were few reliable signs of syphilis to be seen with unaided vision. In full time fetuses, they are more often seen than in the premature fetus. In 1 case only the liver was found a little pale and somewhat fatty, there were changes in the thorax in 4, and histological changes in the thymus in several. In only 5 was the spleen enlarged, the liver being six times the normal weight; chondro-epiphysitis was rare. The *Spirochaeta pallida* was found in 8 cases of 14 known syphilitic macerated fetuses, while in 21 fresh fetuses it was found only once. In 1 of the fresh fetuses in which it was not found, the fetus was a twin of a macerated fetus in which numerous spirochetæ were present. It is suggested that spirochetæ go through a definite developmental cycle. A placenta of a full-time, fresh, syphilitic fetus is little changed on naked eye examination, is no heavier, larger or thicker than normal and even microscopically may seem normal. When the syphilitic fetus is macerated, the placenta is much heavier.

To make a diagnosis of syphilis, a histological examination of the thyroid, thymus, lungs and liver must be made, this is more valuable than a positive Wassermann reaction in the mother or a suspicious obstetric history.

In discussion, Holland had found the Wassermann reaction positive in 97 per cent of his cases and chondro-epiphysitis in 97 per cent, with enlargement of the spleen in every case and the liver not normal but once. As there is no positive weight for fetal organs, one must study the ratio of the weight of the liver and spleen to that of the fetus; if both organs are enlarged, this is a valuable diagnostic sign. In some cases there was positive evidence of syphilis, although spirochetæ were not found.

Bone and Joint Changes in Congenital Syphilis. Bone and joint changes in congenital syphilis are described by Dembo, Litchfield and Foote.¹ In some cases there was acute epiphysitis which disappeared under treatment, others had acute osteoperiostitis which also disappeared under treatment. Syphilitic dactylitis was sometimes seen. The Roentgen ray will often reveal syphilitic changes in bones where the Wassermann may be negative. The treatment of the lesions of the skeleton is mercurial inunctions and the giving of arsphenamine or neoarsphenamine weekly by intravenous injections, and mercurial inunctions three times weekly during alternate weeks, and mercuric

¹ Journal of the American Medical Association, February 4, 1922, p. 319.

chloride. The neoarsphenamine dose is 15 mg. per kilogram of body weight, the mercury chloride dose is $\frac{1}{2}$ mm. per kilogram body weight. Potassium iodide, 5 grains three times daily, helps. Length of treatment depends on the individual case.

The Antenatal Treatment of Congenital Syphilis. The antenatal treatment of congenital syphilis is described by Findlay.¹ Pregnant women treated with salvarsan have 97 per cent living children. The writer treated 15 pregnant women with 14 living children, 1 being lost in difficult labor. These children kept under observation for seven years were well. The Wassermann reaction was negative in all but 1 who gave a weak positive reaction at seven years without symptoms. He gives the details of 5 women who, after treatment in one pregnancy, went on successfully through other pregnancies without return of the disease. Treatment is more successful when the woman is pregnant than in the absence of pregnancy.

Fleming² reports 74 cases of postnatal treatment of congenital syphilis. The best results were obtained by intravenous injections of salvarsan reinforced by mercury. The younger the patient, the better the prospect. When the Wassermann reaction remains negative, the child is considered cured.

ANTENATAL SYPHILIS IS REVIEWED TO A CONSIDERABLE EXTENT by Creadick in the *American Journal of Obstetrics*, October, 1921, p. 451. An extensive bibliography is added. Intensive antisymphilitic treatment of the expectant mother is urged. The fetus benefits through the placenta or through the milk. During pregnancy the mother should be kept under observation. When the mother's Wassermann is doubtful or negative, the baby's is negative. After birth, the infants should receive further treatment. Success has been obtained by giving .03 gm. of mercury per kilogram of body weight intravenously, weekly and 1.3 mg. of mercury with chalk by mouth; every two months .01 gm. arsenic per kilogram of body weight, preceded by spinal puncture. Some prefer 50 per cent mercurial ointment and others vary the doses.

Finkener³ states that syphilis doubled itself in Düsseldorf since the War. The Wassermann reaction is tested in the following way. From the blood of the umbilical vein, 88.7 per cent gave a weak or strongly positive reaction. Some believe that this gives no prognosis for the future health of the child, but such children should be kept under hospital observation. In the majority of cases retroplacental blood will give a positive Wassermann if syphilis is present.

Ross and Wright⁴ studied the frequency of congenital syphilis in a mining town and an industrial town. While there was uncertainty in some cases, 3.5 per cent specimens of placental blood were positive.

Fletcher,⁵ in twenty-five years practice in London, had seen considerable modification in congenital syphilis. The lesions were wide-

¹ British Medical Journal, November 26, 1921, p. 887.

² Ibid., October 22, 1921, p. 654.

³ Monatsschrift für Geburtshilfe, 1921, vol. 54.

⁴ Lancet, February 12, 1921, p. 321.

⁵ British Medical Journal, March 26, 1921, p. 460.

spread but not as pronounced as formerly, and were often present in tuberculosis.

At the Thavies Inn, Adams had excellent success in ante- and post-natal treatment. At St. Thomas Hospital, Jewsbury had observed that, in mothers who had treatment, the mortality of the children was only one-third of that without treatment. Others had observed that the later the syphilis developed during pregnancy, the better the chances for the child. Interstitial keratitis is first treated by arsenic, in addition to mercury in very free doses. Others had seen overgrowth in the milk teeth as a sign of syphilis.

Birth Injury. Platt¹ had studied *birth paralysis*. Early obstetrical treatment should always be tried. Small T-splints of blocked tin or aluminium are very useful. Continued splinting and daily passive stretching at the shoulder joint are valuable.

The writer waits nine months before considering operation. If the lesion is close to the spinal cord, nerve repair is impossible. When the child is older, orthopedic treatment may be useful. Under anesthesia, a posterior subluxation of the shoulder and internal rotation contracture may be cured by a single manipulation. Bone operation, leaving the bone capsule untouched, is useful. After operation, fixation for a short time only, four to six weeks. The older cases need a greater degree of abduction at the shoulder joint. Additional treatment to maintain the condition of the muscles is valuable.

Kofferath² describes a combination of *brachial paralysis with unilateral paralysis of the phrenic nerve*. The mother had pituitrin in labor and episiotomy. The child was a male, not excessive in size. The positive diagnosis was made by Roentgen ray. The case was followed up and the child made a complete recovery. Difficult breathing developed immediately after labor followed by the brachial paralysis.

Ehrenfest³ urges caution and the *avoidance of violence in forceps and breech presentation*, especially in premature labor. In resuscitating asphyxiated infants, all violent manipulations must be omitted. A diagnosis of intracranial injury should be made as early as possible. If only suspected, the clotting time of the infant's blood must be ascertained and spinal puncture done for diagnosis and treatment.

Thomson,⁴ in *congenital hypertrophy of the pylorus of the new born*, believes that excessive action of the adrenals causes biliary hypertrophy aggravated by pancreatic and biliary insufficiency. Most cases are in males and among them the results are worst. For operation, gas and oxygen anesthesia is used, operation should never be done in an emergency, preparation by lavage and infusion not exceeding four days. Operation is indicated as soon as a diagnosis is made and preparatory treatment is carried out. Careful medical after-treatment is essential.

Thomas⁵ contributes a well illustrated paper on *congenital dislocation of the hip joint*. For success, the case must be recognized early and kept

¹ British Medical Journal, November, 1921, p. 885.

² Monatsschrift für Geburtshilfe, 1921, 55, 23.

³ Journal of the American Medical Association, July, 9, 1921, p. 103.

⁴ British Medical Journal, November 26, 1921, p. 889.

⁵ Journal of the American Medical Association, February 4, 1922, p. 323.

under observation until an attempt is made at reduction. This should be done at three years of age. The anatomical condition of the parts making up the joint is important, further knowledge is needed concerning the choice of operation or method of reducing. To be excluded are all patients under two years of age with shortening less than 1 inch and all patients over five years of age with shortening over 5 inches. Successful operation requires dexterity. The position of the limb after operation, treatment during fixation and walking while the cast is worn and treatment after the cast is removed, are all important.

Tate¹ reports the case of a primipara who had some signs of syphilis but denying the disease. Forceps delivery of the child, apparently lifeless, but resuscitated. It was a full term child. On examination, numerous bullæ of the body, mucous patches in the mouth, gangrenous patches on both feet, and undevelopment of the toes was found. Gangrene of the feet spread up the legs, the hands became gangrenous and death occurred on the seventh day.

Blood from the mother and child gave a negative Wassermann, but syphilis was thought to be the cause.

Hydrocephalus has been studied by Dandy.² The blocking of the foramina of Luschka and Magendie produces hydrocephalus. If one of the three foramina is patent and the subarachnoid space is normal, hydrocephalus does not develop. In infants intra-uterine or postnatal inflammation is the cause in some, in others failure of development.

The extent of inflammation and the time of its development determine the character of the case. To find the exact site and character of the obstruction causing the hydrocephalus, ventriculography and the phenol sulphonephthalein tests are necessary. At operation, the lesion can be found. He describes a method of operating.

That **Cephalhematoma** may be serious is shown by Kosmak.³ Labor was spontaneous, uneventful and normal. A steadily increasing cephalhematoma on the right occipito-parietal region was present; by the fourth day it was one-third the size of the head. The child showed evidence of hemorrhage, 30 cc of human blood serum was given subcutaneously, and repeated on the next day, with no improvement. From a suitable donor, a citrated blood mixture of 80 cc was given into the median basilic vein of the right arm, 20 cc of whole blood was given subcutaneously morning and afternoon, the next day followed by 15 cc blood serum. On the eleventh day after birth, the red cells were 2,710,000, leukocytes 11,600, hemoglobin 65 per cent. Highest temperature 101.2° F. The infant was discharged on the thirteenth day.

Five Interesting Cases of Exomphalos or Hernia into the Umbilical Cord are reported by Tenant.⁴ Three recovered after operation, 1 died after operation, 1 recovered without operation. The sac was opened and separated from its contents, and the contents returned to the abdomen if healthy. The vessels of the cord were ligated at the neck of the sac.

¹ American Journal of Obstetrics, April, 1921, p. 724.

² Surgery, Gynecology and Obstetrics, February, 1921, p. 112.

³ American Journal of Obstetrics, June, 1921, p. 973.

⁴ British Medical Journal, February 19, 1921, p. 263.

If gangrenous bowel is found, the outlook is hopeless. A Meckel's diverticulum should be removed. Adhesions may be difficult, appendicostomy may be necessary and was successfully done in 1 case.

The cause is a defect in the development of the mesoblastic layer of the abdominal wall.

Torsion of the Testes Complicating Birth is recorded by Begg.¹ Labor was unattended. The child was admitted eleven days after birth with gangrene of the right testicle, operation and removal together with adhesions, the cord tied at the external ring, followed by recovery. Examination showed a double twist of the cord, adhesions and gangrene.

Intracranial Bleeding in the New Born is described by Haenkel.² Most of these cases occur after spontaneous birth where some degree of asphyxia has developed just before, during, or immediately after, the expulsion of the head. Predisposing causes are toxemia, syphilis and whatever weakens the fetus. Contrary to what is often stated, it cannot be shown that proper use of forceps predisposes to intracranial bleeding. To avoid this accident, the fetal heart sounds should be watched during labor; if evidence of threatened asphyxia develops, labor should be terminated promptly.

Laceration of the Tentorium is reported and illustrated by Zangemeister.³ In 27 intracranial bleedings, 17 occurred from lacerations of the tentorium. To make a positive diagnosis, a small wound was cut through the cranium at each side of the tentorium so that the brain can be inspected and a diagnosis made. Intra-uterine asphyxia was the cause and was present in 22 out of 28 cases.

A New Method of Performing Artificial Respiration in the New Born is described by Greenwood.⁴ It is illustrated. The method is especially adapted for severe cases. The infant is held nearly horizontal, and allowed to move quickly, by its own weight, feet first, about two feet; lifted, feet first upward and to the right of the operator, head downward; then moved quickly downward, head first about two feet. This moves the abdominal mass against and away from the diaphragm, stimulating the action of the heart and respiration. Violence must be avoided.

Hemorrhagic Disease of the New Born. Robertson⁵ employs blood transfusion, not exceeding 15 cc per pound body weight, in this condition. Ten to twelve minutes time is needed, three or four minutes is enough to inject 100 cc of blood. Under local anesthesia the internal saphenous vein is exposed, and an oblique cut is made in the vein and a 1½-inch gold serum needle, filed blunt, is inserted. After transfusion, if the child has bled from the bowel, dark blood is passed during the first twenty-four hours.

The father is the best donor, if available, there is not as much difference in the blood in children as in grown persons.

¹ British Medical Journal, November 19, 1921, p. 843.

² Zentralblatt für Gynäkologie, 1922, No. 4, p. 129.

³ Ibid., 1921, No. 13, p. 457.

⁴ Lancet, May, 1921, p. 964.

⁵ British Medical Journal, May 28, 1921, p. 791.

In 40 cases, 4 died, 2 from septic infection and 1 from intracranial hemorrhage, and the fourth from shock.

Does Asphyxia and Difficult Labor Produce Psychic and Nervous Disturbances in the Infant? Hannes,¹ in 157 children born in asphyxia, found 9 developed abnormally, 5.7 per cent. In 242 infants born by artificial help there were 6 abnormal developments, 2.4 per cent. In 206 normal labors, there were 4.9 per cent of abnormal developments in the children. Among 399 children, between 2.5 and 4 per cent had some abnormal development afterward. These statistics are confirmed by others.

The greater the asphyxia, the greater the danger and more pronounced the development of some complication on the side of the nervous system.

Facial Paralysis is described and illustrated by Rossenbeck.² He believes that injury to the facial nerve does not arise through pressure on the point of exit of the nerve at the stylomastoid foramen, but within the substance of the parotid gland in the region of the lower jaw. The fact that a semielastic substance protects the nerve accounts for the rapid recovery of most of these cases.

Diseased Conditions and Anomalies of the New Born. A CASE OF ICTERUS NEONATORUM is studied by Hellmuth.³ He does not believe that this condition is physiological in the parturient woman. Her blood-serum does not contain more bilirubin than does the blood of the normal healthy woman nor is it believed that a normal pregnancy interferes with the function of the liver and causes an excessive production of biliary coloring matter. Under normal conditions, these substances do not pass through the placenta from mother to child. The new born has always a larger percentage of bilirubin in its blood-serum than has an adult. Nor does the writer believe that there is a relation between the frequency of bile in the serum from blood from the umbilical cord and the degree of icterus which develops. Tests which have recently been made indicate that icterus results from a temporary alteration in the condition of the blood just preceding and just after birth.

TWO SUCCESSFUL OPERATIONS FOR PYLORIC STENOSIS. MacDonald⁴ performed Rammstedt's operation in a very small and weak infant and in a second larger child. A two-inch incision was made, exposing the convexity of the liver, the pylorus was drawn out and incised. The first case gained four ounces in the first week but the spleen did not become normal until four weeks after the operation.

In the second case progress was much more rapid. Very skilful anesthesia is required and after operation very careful feeding with pre-digested food and sodium bicarbonate. The operation itself is not difficult, but should be performed promptly.

¹ Zentralblatt für Gynäkologie, July 23, 1921, p. 1037.

² Ibid., 1921, No. 28, p. 981.

³ Monatsschrift für Geburtshilfe, 1921, 54, 341.

⁴ Lancet, February, 26, 1921, p. 428.

THE INFLUENCE OF THE WAR UPON WEIGHT AND DEVELOPMENT OF CHILDREN. Kutting¹ states that in Germany during 1914 to 1915, the people were fairly well nourished. As the war progressed those living in the country had more and better food than those living in the city. Children born in the country were larger and better developed. Multiparae had larger children than primiparae. It is interesting to note that whatever suffering arose from lack of nourishment in the mother, it was only to a slight extent, if at all, shared by her unborn child. It is true that women badly fed could not nurse children successfully, and that as the war progressed the inability to nurse successfully naturally increased.

A DISCUSSION WAS RECENTLY HELD IN THE FRENCH ACADEMY AS TO THE PERMANENT EFFECT PRODUCED UPON WOMEN IMPREGNATED BY FORCE DURING THE RECENT WAR.² While it is true that in animal breeding the result of the first impregnation is transmitted to subsequent pregnancies, this cannot be shown in the human species. It is not scientifically proven that human beings are subject to the same laws as other animals, but, in his recent essay, Tcherepoff calls attention to the data of the Abderhalden reaction in support of his belief. On the whole, it is said to be impossible to make positive deductions concerning human beings, from the lower animals.

THE EFFECT OF DEFICIENT NOURISHMENT ON THE FAT-CONTENT OF MOTHER'S MILK. Pasch,³ has studied carefully the question as to the effect produced by a diet poor in fat, for a nursing mother, upon the fat-content of her milk; and during the recent War he found that the fat-content of mothers' milk was reduced in a surprisingly small degree by the privations of the mother. A somewhat similar result was observed by dairymen in cows, and fat percentage in cows on limited rations but otherwise well kept, remained remarkably good.

THAT THERE IS A RELATION BETWEEN CONJUNCTIVITIS IN THE NEW BORN AND MATERNAL MASTITIS has been observed by Lang.⁴ He has made bacteriological examinations, and although, at first sight, it seemed as if there was a relationship, he was unable to prove it. One would readily imagine that infection of the nursing breast might be produced by a purulent catarrhal condition in the eyes of the child, but it is very rare for a mother to get a gonorrheal mastitis. While it may be difficult to accurately prove bacteriologically this relationship, there is sufficient danger to warrant the taking of precautions.

THE MORTALITY OF PREMATURE INFANTS. Eden,⁵ by studying the reports of different hospitals, comes to the conclusion that the great cause of mortality in premature children is the lack of coöperation between hospitals and other charitable institutions in following up, medically, the premature child. Employment of wet-nurses by municipalities would lessen the mortality considerably.

¹ Zentralblatt für Gynäkologie, 1921, No. 5, p. 166.

² Journal of the American Medical Association, February, 1921.

³ Zentralblatt für Gynäkologie, 1921, No. 21, p. 744.

⁴ Ibid., No. 21, p. 750.

⁵ Lancet, July, 16, 1921, p. 127.

Budin was able to show that premature children, after discharge from the hospital, have as good a chance as normal babies if they are breast fed. It is difficult to ascertain the exact cause of death in premature children. In 78 per cent, no distinct cause was found. Malnutrition must be the most frequent, such children are susceptible to infection.

It is of the utmost importance that these children receive breast milk, and as it often cannot be obtained from the mother it must be secured from other women.

THAT DRUGS GIVEN TO THE MOTHER AFFECT THE INFANT is illustrated by Smith.¹ In his practice, a nursing mother was taking $7\frac{1}{2}$ grains of bromide of sodium three times daily for ten days, followed by the appearance of an eruption in the infant. When the drug was finally withdrawn, the eruption disappeared. It seemed to occasion no disturbance in the child.

DROPSY OF THE AMNION HAS VERY CONSIDERABLE INFLUENCE IN THE MORTALITY OF THE NEW BORN. Krahula² finds that most of the children born with excessive amniotic liquid, if not stillborn, die soon after birth. But 3.78 per cent survive, and, of these, but 1.03 per cent were normal children. Where twin pregnancy was complicated by excessive amniotic liquid, the chance for normal development in the twins is better than when but one fetus is present, but the risk of premature death is as great as in other cases. When the amniotic liquid increases rapidly in quantity, the birth of a child which can survive must not be expected. If an effort is to be made to save the child with amniotic liquid developing in excess, puncture of the uterus must be made through the abdominal wall. A single puncture will be of little value and repeated puncture is dangerous. The evacuation of the fluid by puncture of the membrane through the cervix is a safer procedure.

CLINICAL TYPES OF CONVULSIONS IN VERY YOUNG BABIES. Thomson,³ in an article of special interest to pediatricians, includes material of obstetric importance. He describes 37 cases of birth injury in which convulsions developed and 4 cases of hydrocephalus among infants injured at birth. Convulsions are the earliest and most striking symptoms, they begin in the first few days of life and male children are more affected than females. In 200 cases of convulsions in infants, 37 belonged to this group. The diagnosis of brain injury depends on the character of the labor, whether premature, the date of onset of symptoms, the child's condition at birth, with especial reference to asphyxia and difficulty in establishing respiration. It is very significant if the anterior fontanelle is found bulging soon after birth or fluid obtained by lumbar puncture is blood-stained. In 200 infants either stillborn or dying soon after birth, cerebral hemorrhage was present in 29.05 per cent, or ten times as common after breech as vertex presentation. Hurried labor in any way is especially dangerous also difficult forceps delivery. It is never found in full time vertex presentation in natural

¹ *Lancet*, April, 16, 1921, p. 825.

² *Monatsschrift für Geburtshilfe*, 1921, **55**, 199.

³ *British Medical Journal*, October 29, 1921, p. 679.

labor. In stillborn children, the dura mater is found torn, but in only 40 per cent of these cases was hemorrhage present, in all breech cases there was some injury to the dura mater. Prolonged, difficult, and forceps labors often showed tentorial tears. These never occur after perfectly normal labors. Infants between seven and seven and a half months are sixteen times more likely than full time infants, to have cerebral hemorrhage. This occurs from distention and bursting of cranial veins with decrease in coagulability of the blood. Intracranial hemorrhage is found in premature cases only. There were no significant symptoms, nor would operation have helped these patients. In but 2 of the cases did the mother receive proper care during pregnancy. To prevent these accidents avoid breech delivery, difficult forceps, induction of premature labor before eight and a half months, and practise dilatation of the birth canal with preservation of the membranes. Antenatal supervision of pregnant women is the best preventive. The outlook is always serious, and, should the child survive mental injury, a tendency to epileptic fits may develop later. Spastic rigidity of the limbs may persist through life. In a few cases operation was successful, in most only general care can be given.

Gordon¹ reports 231 punctures of the superior longitudinal sinus on or before the seventh day of life, 70 per cent alcohol was applied before puncture, made at the posterior angle of the anterior fontanelle. The sinus was usually about one-quarter inch from the skin. A comparatively large needle, No. 18, was used. This method was employed to introduce alkalies, glucose solution or to take blood for Wassermann tests. These children were watched daily for an average of six months. Bleeding was entirely stopped by pressure for fifteen minutes. There were no bad results of any sort observed.

THE SIGNIFICANCE OF FEEBLE HEART-SOUNDS. Bartram² calls attention to the significance in variation in heart-sounds. Unfortunately, it was impossible to distinguish between heart-sounds made slower by pressure in the brain or by carbonic acid poisoning, or by some interference of circulation of the placenta or umbilical cord. From the appearance of the new-born child, it was impossible to tell what had been the cause of any disturbance of its heart before birth. In conducting labor, the safest way is to consider any serious impairment of heart-sounds as caused by pressure upon the brain and so terminate labor as soon as it is safe.

THE QUESTION OF THE DETERMINATION OF SEX AND INFLUENCE OF WAR UPON THE UNBORN CHILD is considered by Ganssle.³ A careful analysis of the statistics shows that war had surprisingly little influence upon the sex of the child and also upon the nourishment of the fetus so long as the mother is able to maintain a comparatively healthy life. For example, in 1899, in 381 births, there were 86.9 per cent of male children; in 1919, in 441 births, 125.4 male, a difference of 38.5 per cent. The circumstances of individual mothers vary so greatly that it is difficult to ascribe this to any general condition.

¹ Journal of the American Medical Association, November 26, 1921, p. 1721.

² Zentralblatt für Gynäkologie, 1921, 84, 34.

³ Zeitschrift für Geburtshilfe, 1921, 84, 159.

DIPHThERIA IN THE NEW BORN. Kreitzler¹ has studied the new born to determine the presence of diphtheria bacilli and their spores at the child's birth. The interesting question arises as to whether the new born is immune from the development of infection, although the characteristic germs may be present. He believes that the mere presence of the germs in the new born does not constitute diphtheria, further, that in studying these children, even when germs were found, they did not set up infection in those who came in contact with them. He would rely upon the usual clinical phenomena confirmed by pathological study in making a diagnosis of diphtheria in the new born.

WHAT CONSTITUTES LIVE BIRTH. Carter² brings up this point in an address giving the results of 100 postmortem examinations. The laws of different countries vary in cases of suspected murder of the new born. English law presupposes that every child is born dead. Scottish laws take the view that every full term child is born alive unless proven to the contrary. The common principle of law holds that a child is born alive in which a movement of the muscle, or the eyelids or detection of heart beat has been established, even though the child should not breathe. It would be desirable if it could be established that a child delivered at full term, found on medical examination healthy, free from any cause of natural death, should be considered as having been born alive.

Littlejohn³ urges the importance of thorough postmortem examination in which the tongue and pharynx should be carefully dissected out and the entrance to the larynx exposed to view, great care must be taken not to interfere with any mass of mucus which may be resting over the entrance of the larynx. In interpreting the appearance of the lungs one must remember that the lungs might have been artificially inflated by efforts at respiration and that putrefaction in the lungs might give the appearance of respiration. He believes that evidence that respiration involving the greater part of both lungs had occurred, was positive proof of live birth in the legal sense.

CRANIOTABES IN THE FETUS. Hughes,⁴ in 154 cases, found craniotabes in the parietal bones which on palpation were much more yielding than normal. He believes that this condition is present at birth in some infants and is not a development of later life. It is frequently not detected at birth and becomes apparent as the child grows older. There is hyperemia of the bone with poor development of the pericranium and dura. There is also atrophy of both parietal bones, the membranes were frequently separated.

A CURIOUS CASE OF CONGENITAL HYPERTROPHY OF THE VAGINAL PORTION OF THE CERVIX IN A NEW BORN CHILD. Herfurth⁵ reports the death of a child from rupture of the tentorium, contracted pelvis and imperfect rotation during labor. The uterus was in normal position,

¹ Zeitschrift für Geburtshilfe, 1921, **84**, 179.

² British Medical Journal, November 5, 1921, p. 749.

³ Ibid., January 28, 1922, p. 142.

⁴ Lancet, November 19, 1921, p. 1045.

⁵ Monatsschrift für Geburtshilfe, 1921, **55**, 125.

but the vaginal portion of the cervix was reddened and greatly thickened and enlarged. An illustration accompanies the article.

THAT THE FETUS CAN BE INJURED BY RIGIDITY OF THE MATERNAL CERVIX DURING LABOR is illustrated by Henrard.¹ His case was a twin labor, second pregnancy, the mother, a vigorous woman, aged twenty-three years, showing symptoms of threatened eclampsia. The pelvis and soft parts were normal. After the rupture of the membranes, the presenting head was very strongly pressed upon by the cervix; when the head of the child was born it was covered with a bloody serous mass, consisting of a wound occasioned by pressure upon the scalp, necrosis of the tissues followed, the child dying on the eighth day. The membranes of the second child were ruptured several hours later and the child was delivered by version and extraction, great difficulty was experienced and two incisions were made and during the effort to deliver, the child died, twelve hours later a spontaneous expulsion had not occurred. The dead child was removed and also the after-birth, the mother made a good recovery.

THE UMBILICAL CORD. Gardiner² found the normal length of the average cord 55 cm. (22 inches), under 32 cm. the cord was short and over 32, and under the average length it is relatively short. In a vertex presentation, the placental insertion of the cord must not be 5 cm. above the superior strait with cord 32 cm. in length to avoid traction. In a breech presentation, the cord must be 55 cm. in length to escape traction, in vertex presentation and one loop about the neck, to escape traction the cord must be 76.5 cm. long. In vertex presentation with the coil of the cord about the neck 93.5 cm. of cord length is necessary for safety. Where the child is in breech presentation with loop of cord about the neck, the loop becomes a spiral and the cord needs very little additional length, but where the cord is coiled about the neck, 101.5 cm. length is needed. In over 5.5 per cent births, the cord was coiled. Excessive amniotic liquid, a long cord, small and active fetus help to produce this condition.

A SUCCESSFUL CASE OF SCLEREMA IN THE NEW BORN. Bourne³ reports a case of an illegitimate male child weighing five pounds, five and a half ounces at birth. The child did badly and, on the sixth day, sclerema developed. The color was exceedingly bad, the facial expression corpse-like, the urine very acid, with a faint smell of acetone in the breath. The temperature was so low that it could not be registered nor could the pulse be felt. The child was placed in an incubator, given $\frac{1}{16}$ grain thyroid extract daily and $\frac{1}{8}$ grain of Gray powder, the bowels irrigated with sodium bicarbonate solution, a teaspoonful to a pint, daily, and 1 grain of sodium bicarbonate was given every four hours by mouth. On the twelfth day, thyroid, $\frac{1}{16}$ grain, was given twice daily, and $\frac{1}{2}$ teaspoonful emulsion of cod-liver oil three times. The treatment was very gradually discontinued, and the temperature of the incubator lowered. On the twenty-second day the child was discharged in fair condition. At

¹ *Monatsschrift für Geburtshilfe*, 1921, **56**, 54.

² *Surgery, Gynecology and Obstetrics*, February, 1922, p. 252.

³ *Lancet*, February 25, 1922, p. 368.

six months the child was normal except for weight while at nine months he had reached a normal weight, was cutting teeth and had a good color.

CAUSES OF FETAL DEATH. Ingraham¹ in 138 fetal deaths, found 68, 49.2 per cent stillbirths, of these birth trauma caused 38, placenta previa 7, toxemia 18, fetal abnormalities 2, and miscellaneous causes 3.

The remaining 70 fetal deaths, 50.8 per cent of the whole had 41 dying within three days after birth and 29 after this time. Among the first were 14 premature children. The causes of death in these infants were those usually complicating labor, cerebral hemorrhage occurred after forceps delivery and extraction, toxemia caused most cases of stillbirth, next prematurity and third forceps delivery. Children who had cerebral hemorrhage often lived after the third day.

INTRA-UTERINE FETAL RIGOR MORTIS. Liegner² reports three cases of fetal rigor mortis. The first had to be delivered artificially, twins being present and rigor mortis developing to such an extent as to make delivery difficult. In the second case a dead fetus was delivered by forceps and rigor mortis was present in the upper muscles of the thighs, but no other rigor mortis developed in the body after birth. The brain was very anemic, with minute hemorrhages. In the third case the child was born spontaneously, the muscles of the neck showing this condition, there had been a premature rupture of the membranes. In this case several groups of muscles were involved, the rigor mortis subsequently disappearing.

Any septic condition of the fetus, whether caused by eclampsia, asphyxia, or any other abnormality, predisposes to the development of rigor mortis. When this occurs, the birth of the child may be considerably delayed and complicated, and the mechanism of labor may become abnormal.

THE WEIGHT OF NEW BORN BREAST-FED CHILDREN DURING THE FIRST TWO WEEKS OF LIFE. Koch³ discusses this question. In 300 new born children, 24.6 per cent regained their original weight within two weeks after birth, 21.7 per cent did not make good the original loss. 53.7 per cent, or over one-half, did badly. Very small and very large babies were abnormal in the matter of gain in weight. Gain and variations in weight do not depend exclusively upon quality or quantity of nourishment taken. One-third of the children, although they nursed deficiently, gained in weight, while one-fifth of the children having very deficient growth had abundant and good nourishment. The children of primipare usually gain weight better than those of multiparæ, while the sex of the child makes no difference.

A VERY INTERESTING STUDY OF THE OSSIFICATION CENTERS OF THE WRIST, KNEE AND ANKLE AT BIRTH was made by Adair and Scammon.⁴ One hundred children were studied and it was found that many variations occurred in the appearance of the centers of ossification. The usual order being (*a*) inferior femoral epiphysis, (*b*) superior femoral epiphysis, (*c*) cuboid, (*d*) os capitatum, (*e*) os hamatum.

¹ American Journal of Obstetrics, May, 1921, p. 821.

² Zeitschrift für Geburtshülfe, 1921, **83**, 400.

³ Ibid., **83**, 475.

⁴ American Journal of Obstetrics, July, 1921, p. 35.

THAT THERE IS A DEFINITE RELATION BETWEEN POLYHYDRAMNIOS AND MALFORMATION is shown by Lau.¹ In 14,650 labors the amniotic liquid was in excess in 75, among these there were 25 cases of malformation, and 9 or 36 per cent were complicated by excessive amniotic liquid. Most of these were anencephalus. Hydrocephalus was present once.

THAT PRENATAL CARE IS PARTICULARLY SUCCESSFUL is shown by Beck.² In his experience, syphilis, toxemia and cardiac diseases are the most usual causes for the interruption of pregnancy, during the second trimester. Relying upon the Wassermann reaction syphilis is treated intravenously by weekly injections of arsphenamine and intramuscular injections of mercury for six weeks, followed by six weekly injections of mercury. In 30 cases of syphilis there was 1 stillbirth, 1 child died within twenty-four hours, 1 of pneumonia in its seventh week. Twenty-seven lived and did well, 6 of them showing some signs of syphilis.

In toxemia, the mother was treated as thoroughly as possible, and, when there was sudden increase in blood-pressure and albumin, labor was induced in the interest of the child. In 37 cases, 4 infants were stillborn.

In cardiac disease the general care of the mother was useful, and, at labor, morphine and scopolamin, with Cesarean section, in case this was necessary. During the last three months of pregnancy, the mother was watched with especial care in the interest of the child.

The improvement under proper prenatal care may be shown by the fact that in 1000 cases with no prenatal care, there were 76 infant deaths. In 1000 cases with prenatal care by nurses only 47 infants deaths, in 1000 cases with prenatal supervision by physicians and nurses, 25 infant deaths.

PYELOCYSTITIS IN THE NEW BORN. Hornung³ describes the case of a female infant apparently healthy having a rectal temperature of 36° C.; after birth 40.2 cc of urine had been taken by catheter and showed abundant leukocytes and bacteria which seemed to be staphylococci. On the eighteenth day the bacillus coli communis was found in pure culture and in great abundance. Treatment seemed to have little effect upon the child. It was taken from the hospital and died of diphtheria some weeks later.

¹ Zentralblatt für Gynäkologie, 1921, No. 26, p. 923.

² Journal of the American Medical Association, August 6, 1921, p. 457.

³ Zentralblatt für Gynäkologie, 1921, No. 30, p. 1067.

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND BLOODVESSELS.

By O. H. PERRY PEPPER, M.D.

DISEASES OF THE HEART.

A part of the confusion concerning cardiac disease at present is the result of the many terms which are used, and which often are used with a different meaning in different localities. Sometimes diagnosis is given in pathological terms, while on other occasions physiological or bacteriological aspects of the disease are made use of. In an attempt to clarify the situation somewhat, White and Myers¹ have drawn up the following classification. It is formed not only from their experience but also from the writings of Mackenzie, Lewis and Cabot. Whether or not it is the best classification is not as important as that it is a satisfactory one, and one which, if generally followed, would result in clearing the confusion which is now so frequent when such old-fashioned terms as mitral regurgitation, myocarditis and cardiac dilatation are employed. It seems worth while, therefore, to quote this classification in full:

I. Etiology. 1. CONGENITAL HEART DISEASE.

2. RHEUMATIC HEART DISEASE.

Including heart disease resulting from tonsillitis, chorea, rheumatic fever and scarlet fever, and also including patients with mitral stenosis, and young people with aortic stenosis or regurgitation not the result of syphilis, even though a clear-cut history of any of these diseases of the rheumatic group cannot be obtained.

A. *Active* (including the subacute rheumatic heart).

B. *Inactive*.

3. DIPHTHERITIC HEART DISEASE.

4. SYPHILITIC HEART DISEASE.

5. OTHER RARER TYPES OF INFECTIOUS HEART DISEASE.

Including invasion by the pneumococcus, the meningococcus, the staphylococcus, the influenza bacillus, the tubercle bacillus and the echinococcus. Chagas has recently reported the common occurrence of cardiac trypanosomiasis in South America, therefore in such a part of the world the etiologic grouping would contain cardiac trypanosomiasis as one of its chief subheadings.

6. THYROID HEART DISEASE, a definite entity characterized by cardiac enlargement and often auricular fibrillation, at times paroxysmal.

7. ARTERIOSCLEROTIC HEART DISEASE OR CARDIOSCLEROSIS, by far the commonest etiologic type of all.

¹ Journal of the American Medical Association, 1921, **77**, 1414.

8. HYPERTENSIVE HEART DISEASE, the result either of nephritis or of "essential" hypertension. The old term "cardiorenal" is ambiguous and often inaccurate, including, as it has done without doubt, many cases of arteriosclerotic heart disease or rheumatic heart disease, with failure and albuminuria. The term used here—hypertensive—is, to be sure, only descriptive and not final; but it is the best available at the present time to cover this group of cardiac cases.

9. THE NERVOUS HEART, including effort syndrome, the irritable heart of soldiers or cardiac neurosis, very common and to be differentiated from heart disease.

10. RARE ETIOLOGIC TYPES, such as cardiac tumors, traumatic heart disease, the beer heart and the heart in obesity. The "athlete's heart" is a doubtful entity, in part at least fitting into the group of neuroses or nervous heart.

If the cause of heart disease is unknown in a given case, it should be so expressed for two reasons: (1) in order to stimulate further study and longer observation of the patient; (2) to stimulate further investigation of heart disease generally.

II. Structural Change. 1. MYOCARDIAL. Under this heading, myocardial pathology, whether actual myocarditis or myocardial hypertrophy or atrophy, may be taken for granted according to the etiologic type, except in the case of the nervous heart and at times in congenital heart abnormalities. Thus, rheumatic heart disease implies involvement of the myocardium with the typical submiliary nodules of Aschoff; syphilitic heart disease implies invasion by spirochetes; arteriosclerotic heart disease implies myocardial degeneration, with fibrosis resulting, and hypertensive heart disease implies hypertrophy. If the etiologic type of heart disease is stated the myocardial changes associated with the type may be taken for granted.

Myocardial infarction from coronary thrombosis, if extensive, leading to cardiac aneurysm and perforation into the pericardium, is a structural change in the heart which is usually diagnosticated at the necropsy table. There is clinical evidence of the condition, however, on occasion, in the presence of severe prolonged heart pain if the thrombosis is extensive. Arteriosclerosis is the usual etiologic factor.

2. ENDOCARDIAL. The only portion of the endocardium giving evidence of damage clinically is the valvular endocardium. Therefore, clinical diagnosis of endocardial pathology has perforce to be limited to valve changes.

- A. *Mitral involvement* with, or without, stenosis. This does not mean functional mitral regurgitation.
 - B. *Tricuspid involvement* with, or without, stenosis. This does not mean a functional tricuspid leak.
 - C. *Aortic regurgitation*.
 - D. *Aortic stenosis*.
 - E. *Pulmonary regurgitation*.
 - F. *Pulmonary stenosis*.
3. PERICARDIAL.
- A. *Acute fibrinous pericarditis*.

- B. *Pericardial effusion*: (a) serofibrinous; (b) purulent and (c) hydropericardium.
- C. *Adhesive pericarditis*.
- D. *Pneumopericardium*.

4. CARDIAC SIZE AND POSITION.

- A. Enlargement, usually meaning both hypertrophy and dilatation, the exact amount of each being indeterminable.
- B. Ventricular preponderance; either left or right ventricle may be relatively more enlarged than the other. Roentgen-ray evidence is often suggestive; but electrocardiograms are needed to demonstrate this condition.
- C. Auricular enlargement, sometimes evident by roentgen ray or electrocardiogram.
- D. Dextrocardia. The squat transversely placed heart of an obese patient and the vertical "narrow" or "ptosed" heart of the tall lean patient are in themselves unimportant. They are merely a feature of the given type of case.

5. GREAT VESSELS.

- A. Aortic dilatation; (a) general, and (b) saccular aneurysm.
- B. Patent ductus arteriosus.
- C. Coaptation of aorta.
- D. Transposition of aorta and pulmonary artery (and other rare congenital defects).

6. SEPTAL DEFECTS.

- A. *Interventricular foramen*.
- B. *Foramen ovale*.

III. Functional Condition. 1. HEART FAILURE.

- A. *Congestive type*, as expressed by edema, cyanosis, engorgement of neck veins and so on. This, of course, may be of any degree.
- B. *Anginal type*, just as important as the congestive type and often more so, expressed by heart pain.

2. DISORDERED HEART ACTION.

- A. *Premature contractions* (extrasystoles): (a) auricular, and (b) ventricular.
- B. *Paroxysmal tachycardia*: (a) auricular, and (b) ventricular.
- C. *Auricular flutter*.
- D. *Auricular fibrillation*.
- E. *Heart block*: (a) auriculoventricular; (b) intraventricular, including complete and partial bundle branch block and arborization block; and (c) sinoauricular, including auricular standstill.
- F. *Atrioventricular rhythm* and ventricular escape.
- G. *Pulsus alternans*.

An additional functional grouping, such as that suggested by the New York Association of Cardiac Clinics, is also very useful. It expresses directly the ability to work as follows:

- A. Able to carry on the patient's usual activities.
- B. Able to carry on slightly to moderately curtailed activity.
- C. Able to carry on only greatly diminished activity.
- D. Unable to carry on any activity (without distress).

The authors give an illustration of how this classification would apply to several cardiac patients.

CASE 1.—Rheumatic heart disease (inactive) with mitral stenosis, right ventricular preponderance, auricular fibrillation and failure of the congestive type (able to carry on only greatly diminished activity).

CASE 2.—Arteriosclerotic heart disease with cardiac enlargement, ventricular premature beats, pulsus alternans, and failure of the anginal type (unable to carry on any activity).

CASE 3.—Cardiac enlargement and auricular flutter of unknown cause (able to carry on slightly curtailed activity).

CASE 4.—Syphilitic heart disease with aortitis, aneurysm of ascending aorta, aortic regurgitation, left ventricular preponderance and normal rhythm (able to carry on moderately diminished activity).

Anatomy of the Heart. THE BLOOD SUPPLY OF THE HEART. Of fundamental importance for the proper understanding of cardiac pathology is a clear conception of the blood supply of the various parts of the organ; the heart muscle, the endocardium and the valve leaflets. Early investigators were forced to be satisfied with the results obtained by careful dissection, by which method the coronary artery circulation was clearly demonstrated by Haller in 1757. Later, injections of the bloodvessels with metals with subsequent corrosion of the tissues was the method of choice, but this in turn was replaced by roentgenographic studies of the vessels after injection with some opaque substance. Stereoscopic roentgenography added many details, and by clearing the organ with oil after injection still further data were obtained.

Gross¹ has recently reviewed this subject and published his results obtained by using a somewhat modified combination of these several methods. His book should be referred to at first hand, if only for the numerous and beautiful illustrations.

It is found that the right coronary artery in the typical heart supplies the entire right ventricle with the exception of the left third of the anterior wall, and also the right half of the posterior wall of the left ventricle and a small strip of the interventricular septum. The left coronary artery supplies the whole remaining part of the left ventricle, the small left anterior portion of the right ventricle not supplied by the right coronary artery and a small anterior strip of the interventricular septum. At the junction of the two branches there occurs an area supplied by both vessels. The branches of the coronary arteries are quite inconstant; in 44 per cent of the cases most of both auricles were supplied from the right, and in 20 per cent from the left, coronary artery. In the other 36 per cent the distribution of auricular branches was about equal from the right and left coronaries.

The neuromuscular tissue which constitutes the conducting apparatus of the heart receives a distinct and specific blood supply to both the sino-auricular and auriculoventricular nodes, the main bundle and parts of its right and left limb. The final arborization receives a supply which corresponds to the area of heart musculature upon which it rests. In

¹ *The Blood Supply of the Heart*, New York, Hoeber, 1922.

the specific blood supply to the nodes and bundle the right coronary artery is by far the more frequent source, but some variability exists, as might be concluded from clinical experience. It has been observed that blockage of the same part of a coronary artery produced in different hearts different results in the bundle.

The blood supply of the heart valves has been the subject of much controversy. Gross, however, succeeded in injecting the valves in about 6 per cent of normal hearts, and, of these, the aortic cusp of the mitral valve was the most frequent. This is the cusp which, in adults, is the most frequently involved by valvular endocarditis, and as adult years are reached it is the last cusp to show the regression of musculature which occurs after infancy.

Gross also believes that anastomoses in the heart are universal and abundant, not only between the right and left coronary arteries, both in their capillary as well as precapillary distribution, but also between the branches of each coronary artery, and between the coronary arteries and vessels from the adjacent and attached organs, such as those of the pericardium and diaphragm. The occurrence of infarcts in the heart is not to be explained, therefore, on the absence of anastomoses but on other factors, such as the failure of the intricate anastomotic system to promptly and adequately compensate. Some compensation does, however, occur, and this is more adequate in the case of older individuals when the anastomoses are patent and free and when the *arteriæ telæ adiposæ* are well developed. This question of the changes in the blood supply of the heart which occur with increasing age is one of great interest.

The vascular architecture of the heart shows strikingly the remarkable effect of increasing age in a cycle of events which register unmistakably their effects on function, both physiologically and pathologically. One of these changes concerns the amount of subpericardial fat. This bears no relation to the amount of subcutaneous fat but increases steadily from soon after birth until the eighth decade of life. That this increase of subpericardial fat is of considerable importance is emphasized by the studies of Gross, for as age increases the number of arterial pathways are increased by the arteries of this fatty tissue. At birth no "*arteriæ telæ adiposæ*" are visible in the subpericardial fat, but a few of these appear by the second decade. In the third decade there can be demonstrated a definite, though not yet marked, left-sided vascular preponderance, and anastomoses are now much more clearly made out. These changes become more marked in the fourth decade of life and tortuosity of vessels becomes more evident. The two illustrations here reproduced from Gross's book illustrate the circulation in the fourth decade. Fig. 1 shows the injected arterial system as seen in a roentgenogram, while Fig. 2 is a photograph of an injected and cleared heart of the fourth decade.

In the fifth and sixth decades of life the left-sided vascular preponderance and tortuosity of vessels becomes even more marked and the anastomoses at the septum become very patent and free. The fat-vessel network continues to increase through these decades and reaches

its height toward the end of the seventh or beginning of the eighth decade. The other changes continue in a similar fashion. By the seventh decade the vascular system of the heart is so altered as to make it capable of withstanding with much greater success the obliteration of these large arteries. This is because of the existence of patent and free anastomoses and of the presence of the dense network of vessels in the fatty tissue.



FIG. 1.—Roentgenogram of the blood supply in the average heart of the fourth decade.

Gross considers these "*arteriæ telæ adiposæ*" as an important and apparently hitherto unrecognized, functional compensating factor which protects the heart against the results of obliterative changes in the other arteries. It is the right heart which loses most of its vascularity with increasing age, possibly as a result of its lessened activity and importance as compared with the left ventricle. This gradually developed relative right-sided anemia is of the utmost importance in increasing the dangers of death from right-sided heart paralysis in the aged. Gross

suggests that it explains many of the deaths in infectious diseases in old age. In fact, he terminates his most interesting book with the saying that perhaps it is permissible to paraphrase in this connection the old adage about a man being as old as his arteries so as to read, "A man is as old as his right coronary artery."

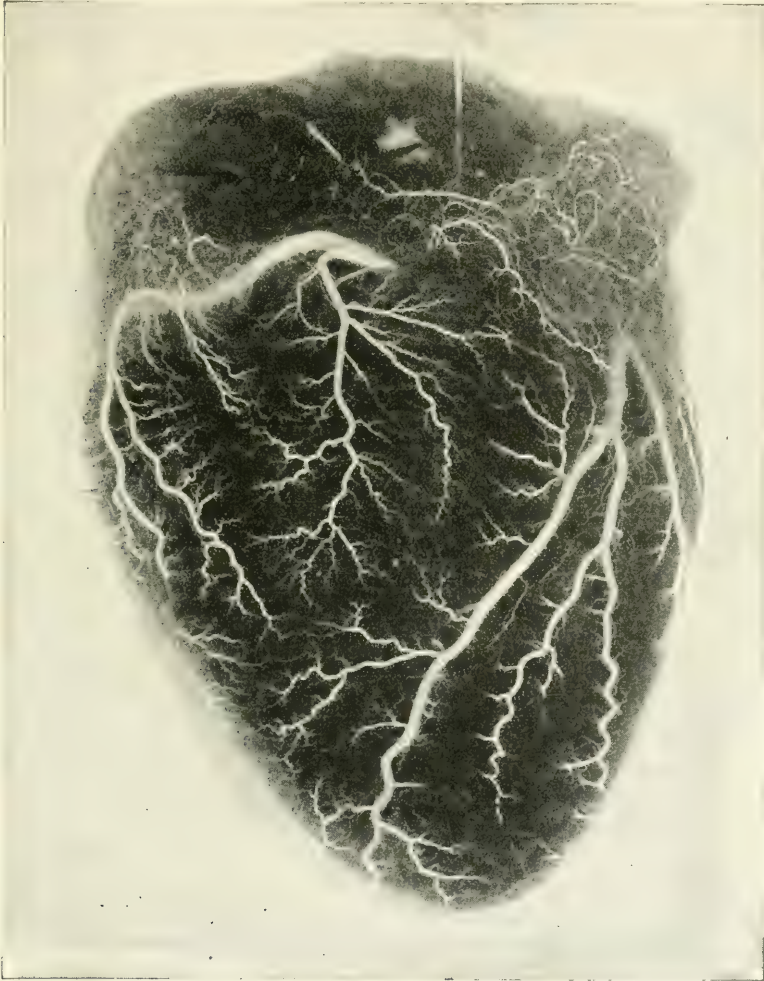


FIG. 2.—Photograph of the anterior surface of an injected and cleared heart of the fourth decade, showing the distribution of the arteriæ telæ adiposæ.

The book is beautifully gotten up; the illustrations are many; and there is an excellent bibliography and index. The book has been given this lengthy mention here because of its apparent fundamental value.

Whether the development of the blood supply determines the size or shape of the heart is not yet known; it would seem that it might. Tallquist¹ has recently reviewed the data concerning "Small-sized Hearts."

¹ Finska Läk.-Sällsk. Handl., 1921, 63, 335 (Abstract, Journal of the American Medical Association).

In the 17 cases which he has studied carefully there were, in 15, signs of constitutional anomalies and various symptoms, such as palpitation, arrhythmia and ready fatigue on exertion. He believes that the small heart has been arrested in its infantile stage and that it lacks the ability to develop a compensating hypertrophy upon demand. These small hearts do not enlarge with advancing years, but remain unaltered in size.

Hirsch and Shapiro,¹ after a careful study of the size and shape of the heart as determined by roentgen-ray observation, have come to the conclusion that the patient's habitus must be taken into account in any interpretation of the roentgen-ray study of the morphology of the heart. The position of the heart and its shape vary with the habitus, and the habitus must be taken into consideration in estimating the cardiac size. Reasoning by analogy they also conclude that the cardiac function, particularly as regards muscular tonus, may perhaps vary with the habitus. They suggest a somewhat complicated system of measuring the heart which need not be detailed here. The following table from their article gives a picture of the variations according to habitus:

TABLE 1.—AVERAGE STANDARD MEASUREMENTS IN RELATION TO HABITUS.

	Transverse diameter.	Long.	Broad.	Aortic arch.
Asthenic	8.8	11.4	9.9	3.9
Hyposthenic	11.1	13.1	10.6	4.8
Sthenic	12.4	14.1	10.6	5.1
Hypersthenic	13.8	14.7	10.7	5.7

Groedel,² whose previous work in this line is well known, has recently reported on the further development of hearts which have become enlarged in early life. In some instances the organ continues to maintain its relatively excessive size despite the growth of the body. In other instances the size of the heart apparently remains stationary and as the body grows the so-called "heart quotient," that is to say, the ratio between the width of the heart and the width of the lungs at the base, becomes approximately normal. Groedel considers the normal "heart quotient" to be about 1 to 1.9 in both children and adults.

The Incidence of Circulatory Abnormalities in Young Women. An interesting contrast to the material collected by the various cardiovascular boards during the war is offered by a report by Piersol³ of the study of the cardiovascular apparatus in 7489 young women applying for employment with the Bell Telephone Company of Pennsylvania. The following tables copied from Piersol's article give some of the statistics of the findings:

TABLE I.

Total number of applicants examined in 1919-1920	7489
Total number of applicants rejected (all causes) in 1919-1920 (11.7 per cent of total)	878
Of this number those rejected for cardiovascular disease (30 per cent of rejections)	265
Of those accepted variable functional murmurs occurred in	132
Total number showing any kind of cardiovascular signs (5 per cent of the total, 7489)	397

¹ American Journal of the Medical Sciences, 1921, 162, 892.

² Archiv für Kinderheilkunde, 1921, 69, 365.

³ International Clinics, 1922, 1, 86.

TABLE II.

The 265 cases are divided, viz.

True chronic endocarditis	106 (40.0 per cent)	} 60 per cent
Hyperthyroidism	70 (26.4 ")	
Toxic or infectious myocarditis	55 (20.7 ")	
Neurocirculatory asthenia	30 (11.3 ")	
Chronic nephritis	3 (1.1 ")	
Chronic pericarditis	1 (0.37 ")	
Total	265	

Chronic endocarditis is further divided according to lesion and etiology, viz.:

Lesion.	Etiological factor.						
	Number of cases.	Chorea.	Tonsils.	Rheumatism.	Both.	Other infections.	"Flu."
Mitral regurgitation	63	3	37	8	6	3	0
Mitral stenosis	8	0	3	1	0	0	2
Double mitral lesions	25	0	9	7	0	3	3
Aortic regurgitation	6	0	2	1	0	0	0
Aortic regurgitation and stenosis	4	0	2	0	0	1	1
Total	106	3	53	17	6	7	6

Piersol summarizes his observations on this group of presumably healthy young women, representing a fair average type of the employees found in the business offices of a great city as follows:

1. Out of 7489 women applicants, aged between sixteen and thirty-five years, a little over 5 per cent showed some departure from what is generally regarded as a normal circulatory apparatus.

2. Of those found physically unfit for employment, 30 per cent were rejected because of some cardiovascular defect.

3. Chronic endocarditis was observed in 40 per cent of these rejected cases. The majority, therefore, suffered from other types of circulatory disturbance.

4. Mitral regurgitation uncomplicated was two and a half times as frequent as any other variety of endocarditis and constituted 59 per cent of all the cases of true endocarditis encountered. This would indicate that even when the same criteria are used for diagnosis, this lesion is somewhat more frequent in a group of young women than in the men of similar age studied by the Cardiovascular Board of the Army.

5. Aortic regurgitation was of uncommon occurrence in this group of young women, a finding similar to that observed among larger groups of young men.

6. In the cases of endocarditis, tonsillitis was three times as common as any other etiological factor.

7. Over one-half of the systolic murmurs heard either at the base or at the apex could not be regarded as endocardial and might be classed as so-called "functional" murmurs. On the other hand, none of the diastolic murmurs heard either at the apex or the base could be regarded as due to anything but true endocarditis.

8. Cardiovascular symptoms, due to thyrotoxicosis, were present in 26.4 per cent of these young women. Thyroid enlargement associated with toxic symptoms, therefore, was apparently five times as common in these young women as it was in rejected recruits. Over 50 per cent of this group of rejected women applicants had some form of thyroid enlargement.

9. Effort syndrome is not by any means limited to soldiers, but in a mild form also occurs among young women in civil life.

Diseases of the Myocardium. MYOCARDIAL NECROSIS IN HYPERTHYROIDISM has been discussed by Goodpasture^{1 2} in two papers during the past year. He gives credit to Fahr, in 1916, for drawing attention to the fact that lesions of the cardiac muscle more severe than the well-known fatty degeneration occur in hyperthyroidism. Fahr believes that the lesions had not been carefully searched for because of the prevailing view that the cardiac disorders are due to a toxic action on the nerves of the heart.

In the hearts from 2 cases of hyperthyroidism, in both of which auricular fibrillation had been present for some time before death and in both of which death was evidently due to myocardial exhaustion, Goodpasture found areas of acute necrosis of the myocardium, in one so extensive as to involve a large part of the left ventricle. Similar acute necrosis is rare from any cause in adults but does occur from infarction and in severe infectious myocarditis and occasionally in toxic myocarditis. In children it is more common in association with extreme intoxication, usually by diphtheria or scarlet fever.

Varying views may be held concerning the relation of the hyperthyroidism to the myocardial lesions. The muscle necrosis may be a direct outcome of an underlying progressive change in the muscle, due to the action of products of the diseased thyroid gland, but the pathological evidence does not bear out this suggestion. On the other hand there is no evidence to point to a severe infection as the cause of the necrosis, although the lesions are similar to those found in the heart after death from an infectious process. No vascular lesions were found to explain the necrosis.

Fahr believes that the myocardium is injured directly by the toxic products of the diseased thyroid gland. Goodpasture studied the effect on the myocardium in animals of administering desiccated thyroid gland by the mouth or crystalline thyroxin intravenously. The animals developed characteristic clinical symptoms with definite, although relatively slight, myocardial lesions. When, however, such treated animals were subjected to chloroform anesthesia, striking widespread myocardial necrosis developed.

¹ Journal of the American Medical Association, 1921, **76**, 1545.

² Journal of Experimental Medicine, 1921, **34**, 407.

Chloroform would seem to be unusually harmful in cases of hyperthyroidism and, if possible, should be avoided. Perhaps in the clinical cases a low-grade and inconspicuous terminal infection was the added insult which, corresponding to the chloroform in the experimental animals, produced, in a myocardium weakened by the hyperthyroidism, the serious and extensive necrosis.

In children with pronounced lymphatism, sometimes associated with enlargement of the thyroid gland, sudden death apparently occurs not infrequently if the reports in the pediatric literature are correct. For example, Rieder¹ reports 9 such cases and in 7 of these he found the myocardium infiltrated with lymphocytes and round cells. In 4 instances the thyroid was enlarged, but there is no suggestion that any true toxic overaction of the gland was present, nor were any necroses observed in the myocardium, such as Goodpasture reports.

Hamilton,² however, is convinced that the great majority of hearts in patients with hyperthyroidism present no evidence of damage.

Christian³ does not believe that any large proportion of cases of chronic myocarditis are the result of continued hyperthyroidism; and, although acute infection often leads directly to myocarditis, yet it is not proved that the cause of typical chronic myocarditis, such as is so often associated with nephritis and hypertension, is to be found in the injurious effects of single or repeated infections. In this triad of nephritis, hypertension and myocarditis, syphilis seems to play a minor role. Christian tends to the opinion that very similar causative factors are operative in the production of these three conditions, but that we can rarely say for a given case that the cause has been a definite one. In all three conditions we have reason to believe that some disturbance in the small arteries constitutes an important part of the lesion.

SYPHILITIC MYOCARDITIS. Christian's statement quoted above is far nearer the truth than is the opinion of several writers who were quoted last year in this article to the effect that fibrous myocardial hypertrophy and the interstitial nephritis which it accompanies are both in the majority of cases produced by syphilis.

Stobie⁴ found among 13 patients of various ages with signs of congenital syphilis only one case with any suggestion of cardiac disease. In 6 patients in the primary stage of syphilis no abnormal cardiac signs were found, while among 23 in the secondary stage, 1 showed an extrasystolic arrhythmia, which improved during treatment with mercury. Out of 8 cases with tertiary manifestations, 1 was found to have an enlarged heart with extrasystoles.

A catchy term helps sometimes to fix a fact in our memories. Lenoble⁵ believes that long after the actual spirochetal infection of the heart muscle has died out the resulting lesions still persist and are recognizable as a myocarditis or aortitis, as the case may be. He considers it

¹ Jahrbuch für Kinderheilkunde, 1922, **97**, 9.

² Boston Medical and Surgical Journal, 1922, **186**, 216.

³ Wisconsin Medical Journal, 1922, **20**, 455.

⁴ Quarterly Journal of Medicine, 1921, **15**, 26.

⁵ Annales de médecine, 1921, **10**, 125.

important to remember that the spirochetes are no longer present and so names these lesions "deshabitées," vacated or uninhabited lesions. There is some evidence to suggest that this view is not entirely correct, but that the infection is still present but very quiescent. At any rate, in these late cases antisyphilitic treatment seldom does very much benefit.

This view does not apply of course to the earlier or more active syphilitic cases, but only to the late ones. Koppang¹ admits that while specific treatment of syphilitic disease of the heart may be at times very efficacious, yet in other instances it may be very disappointing. He states that he has witnessed insufficiency of the aortic valve develop in the midst of arsphenamin treatment.

TYPHOID INFECTION OF THE HEART was touched upon in last year's review and a statement was quoted to the effect that while the myocardium is often attacked, no endocardial complications have ever been seen. During the past year, Minet and Legrand² have reported instances of typhoidal myocarditis, and also quote three instances of what they believe to be typhoidal endocarditis. On critical examination of these case reports the reviewer is unable to admit the probability that the endocardial lesions were due to the typhoid bacillus. This does not suggest that typhoidal endocarditis never occurs, for such cases as those reported by Liebermeister, Desnos, G. de Mussey, N. Pepper, Bouchut, Laenger, Girode, Vincent, and Castaigne demand consideration. But the occurrence of this complication of typhoid is very rare, and especially so in contrast of the myocardial involvement.

THE MYOCARDIUM IN PREGNANCY is that part of the heart which concerns us most. One finds in the literature that the fitness for pregnancy of patients with heart disease is usually estimated in terms of such valvular defects as may be present. This is a fallacious method, for no matter what valvular lesion is present it is the myocardial condition which, in the final analysis, determines the heart's ability to stand the strain of pregnancy and labor. It is with satisfaction, therefore, that one meets an article such as that recently published by Pardee.³

This author very properly places little emphasis on the finding of the evidences of a mitral stenosis and even less on the discovery of an uncomplicated mitral regurgitation. The criterion which he adopts is the patient's reaction to exercise.

"By combining the patient's symptoms after her ordinary exertions with her reaction to the foregoing exercise test we have been able to place all patients in one of the four following categories:

"Group 1. Patients who were not troubled by what they considered unusual dyspnea or palpitation on exertion before pregnancy and who did not develop this during pregnancy. These patients showed a normal reaction to the test exercise, or, if not, they were placed in Group 2.

¹ Norsk Magazin for Laegevidenskaben, 1922, **83**, 65 (Abstract, Journal of the American Medical Association).

² Paris médicale, 1921, **11**, 233.

³ Journal of the American Medical Association, 1922, **78**, 1188.

"Group 2. Patients who were not troubled by unusual dyspnea or palpitation on exertion before pregnancy, but who had either complained of this during a previous pregnancy or who had such a complaint during the present pregnancy. These patients showed a normal or moderately increased reaction to the test exercise. If they showed a markedly increased reaction they were placed in Group 3.

"Group 3. Patients who had been troubled by unusual dyspnea or palpitation on ordinary exertion before pregnancy and who had noticed an increase of these symptoms during a previous pregnancy or during the present one. These patients showed a moderately increased reaction to the test exercise. If they showed a markedly increased reaction they were placed in Group 4.

"Group 4. Patients who had been troubled by unusual dyspnea or palpitation on exertion before pregnancy, these symptoms having been markedly accentuated during a previous pregnancy or just previous to or during the present one, so that the patient had to remain in bed for a time. A history of bed sickness from heart disease when the patient was not pregnant was not considered to place her in Group 4 unless it was less than six months previous to the present pregnancy. These patients all showed markedly increased reactions to the test exercise."

Pardee believes that women in Groups 3 and 4 "should be allowed to undertake pregnancy only when there is some very special reason for having a child or when they are ready to keep themselves under constant observation of a physician who is accustomed to handling such cases." "A certain number of these pregnancies in severe cases will have to be interrupted in the interest of the mother's life before the child is viable, but the great majority of them can be carried through successfully."

For the exercise test, Pardee has the patient swing a 10-pound dumb-bell twenty times from over her head to as near the floor as she can conveniently reach, repeating the movement about once every two seconds. A normal pregnant woman can carry out this procedure without distress and with only a slight sense of breathlessness. There should be only slight objective dyspnea and increase in pulse-rate. By the end of one minute the respiration should have become normal and the pulse nearly so, the pulse returning quite to its normal rate at the end of two minutes.

Such a simple test as this gives much valuable information and estimate of the true condition of many cardiac patients. Of course, judgment must be exercised in the avoidance of such an exercise test in patients with severe cardiac decompensation or other conditions which might be aggravated by the exertion.

HEART MUSCLE CHANGES IN PNEUMONIA are discussed by Stone¹ on the basis of the autopsy material of the U. S. Army Base Hospital at Fort Riley from October, 1917, to the end of 1918. The following table from his article gives the percentage occurrence of gross changes in the heart muscle in a series of 259 autopsies upon pneumonia patients:

¹ American Journal of the Medical Sciences, 1922, **163**, 659.

TABLE II.

	Lobar pneumonia (89 autopsies) per cent.	Broncho- pneumonia (112 autopsies) per cent.	Sepsis following pneumonia (58 autopsies) per cent.
Heart muscle normal	57.3	66.1	37.9
Heart muscle degeneration	42.4	33.9	62.1
Right ventricle dilatation	39.4	36.6	20.8
Left ventricle dilatation	12.4	10.0	12.1

Table III shows the microscopical findings in a smaller series of cases:

TABLE III.

	Lobar pneumonia (34 autopsies) per cent.	Broncho- pneumonia ¹ (37 autopsies) per cent.
Heart muscle normal	20.6	40.5
Parenchymatous degeneration	52.9	37.8
Fatty degeneration	11.7	8.1
Leukocytic and round-cell infiltration	8.9	10.8
Hyaline degeneration	2.9	
Interstitial myocarditis	2.9	2.7

Diseases of the Endocardium. Instances of BACTERIAL ENDOCARDITIS belong to one or other of two main groups. In the first group, which has been called the primary or cryptogenetic group, belong those cases in which the only important lesion is in the endocardium; while the other group, sometimes designated as secondary, includes the cases in which the endocarditis is merely a part of a general septicæmia. In the primary group the endocardial lesion acts as the only distributing focus, keeps up the bacteræmia permanently or transiently, and is the source of emboli. On the other hand, in the secondary group there are one or more foci in addition to the one in the endocardium, feeding bacteria and emboli into the blood stream.

The above is an abstract of part of an interesting discussion of Staphylococcus aureus endocarditis by Lamb and von Glahn.² They point out that in the primary group there occur both acute and chronic cases, the latter being practically all caused by the non-hemolytic streptococcus, a very few by the influenza bacillus and very exceptionally by other bacteria; in the acute cases the important organisms are the hemolytic streptococcus, pneumococcus, staphylococcus aureus and gonococcus. It is obvious that a case may commence as an acute form of the first group and rapidly become a member of the second group. The majority, if not all, of the staphylococcus aureus cases progress in this way. On the other hand, only about 20 per cent of the cases of staphylococcal bacteræmia develop endocarditis, and this has an influence on prognosis, for while approximately 75 per cent of cases of staphylococcus aureus bacteræmia die, all cases of this infection which develop an endocarditis terminate fatally in a short period of from a few days to an outside limit of five weeks.

¹ Including confluent lobular and interstitial types.

² Medical Clinics of North America, 1922, 5, 969.

For the positive diagnosis of staphylococcus bacteremia a blood culture is essential, but that a staphylococcus is responsible in any cases presenting the picture of septicemia may be suspected if a history of boils or of osteomyelitis is obtained, or if certain typical skin lesions are discovered. These are small petechiae, with tiny yellowish-white centers, due to minute abscesses surrounded by a small red halo. Cutaneous ecchymoses and miliary abscesses in the hairy scalp have been reported. Emboli to any part of the body with resulting purulent foci are common, and abscesses in or beneath the muscles are highly suggestive of this organism.

It is important to remember, as Lamb and von Glahn remind us, that while the non-hemolytic streptococcus endocarditis is almost always engrafted upon a previously damaged heart valve, this is not true of the staphylococcus aureus. The recognition of the development of endocarditis in a case of staphylococcus bacteremia is difficult and depends chiefly on some change in the existing cardiac signs, either the development of a new cardiac murmur or an alteration in the quality of an existing murmur. Abscess formation in the myocardium and reaching the pericardium may result in the appearance of a pericardial friction, which is suggestive of endocardial involvement as well.

The 3 cases which Lamb and von Glahn report are each of considerable interest:

Case I, in a boy, aged thirteen years, commenced with an abscess on his foot but had a history of having had boils in the past.

Case II, also a boy, aged thirteen years, had also had boils, and one month before the onset of his bacteriemia he had had an abscess in his ear opened.

Case III, a young woman, developed a sore heel while dancing; a week later she collapsed and had a chill. All three cases ran a rapidly fatal course and were confirmed at autopsy.

A few cases of bacterial endocarditis not due to the non-hemolytic streptococcus have been reported in the recent literature and may be worth mention at this point.

Colistro and Ferrer¹ report the clinical and necropsy findings of the case of a woman who, for many years, had had a mitral stenosis which, however, had not resulted in evidences of cardiac inadequacy. Following a septic abortion a septic endocarditis developed, perhaps from an embolism into the previously damaged valve.

Among the rare infections which may cause endocarditis is *plague*. Teissier, Gastinel and Reilly² found acute mitral endocarditis with fresh vegetations due to the plague bacillus in the heart of a young woman who died on the sixth day following an onset with intense headache, epistaxis and vomiting.

GONORRHEAL ENDOCARDITIS has been recognized with increasing frequency during the twenty-five years since the first case was described. The endocarditis is of the type which develops during a bacteremia and

¹ Revista médica del Uruguay, 1921, **24**, 203 (Abstract, Journal of the American Medical Association).

² Bull. et mém. Soc. méd. des hôp., 1921, **45**, 1268.

this invasion of the blood by the gonococcus probably occurs much more frequently than was formerly believed. Studies of the relation of the endocardial infections to the primary gonorrhea have not demonstrated any constant time relationship.

A recent review of the subject by D. C. Smith¹ includes an interesting case report: The patient was a male, aged twenty-eight years, who, about four months before admission, had uncomplicated urethritis. Two months later he commenced having chills, with fever and sweats. Three weeks before admission he developed edema and dyspnea. Finally, he was referred to the hospital with a diagnosis of liver abscess. He was in very poor condition; very dyspneic and hiccoughing. Over the base of the heart to the left of the sternum a double murmur could be clearly heard; the systolic murmur was faintly heard at the apex. The heart was not markedly enlarged, nor was the liver or the spleen palpable.

The laboratory findings included a leukocyte count of 17,300; the evidences of a marked secondary anemia; several negative examinations for malaria; a negative blood culture; and the constant finding in the urine of albumin, casts including "pus casts," and 10 to 15 pus cells and a few red cells to the high power field.

Impressions concerning the case were recorded as follows: "Ulcerative and vegetative endocarditis, probably of aortic valve because of relative infrequency of pulmonic endocarditis." The fever ran an irregular course and gradually became less high as the condition became worse. Death occurred on the twelfth day after admission. At autopsy ulcerative endocarditis was found involving the pulmonic and aortic valves and also the mural endocardium. Vegetations were present on the valve leaflets, and the left leaflet of the pulmonic valve was almost wholly destroyed. Smears from the heart's blood and from thrombi on the leaflets showed Gram-negative, intracellular biscuit-shaped diplococci, but cultures were negative.

It is worth commenting upon the tendency of the gonococcus to involve the right side of the heart; this occurs in about one-third of the cases and is thus much more frequent with the gonococcus than with any other organism. There is some experimental work which shows that the gonococcus grows more abundantly when the carbon dioxide tension is slightly increased, and this, if true, might explain the predilection of the gonococcus for the right side of the heart where this condition prevails.

Although the gonococcus does seem to show some predilection for the right side of the heart, it is proper that we should remember the infrequency with which this side of the heart is involved by any bacterial endocarditis. Right-sided fetal endocarditis is familiar and right-sided involvement in association with left-sided involvement is not extremely rare, but primary acute or malignant endocarditis confined to one or other of the right side of the heart is very infrequent indeed.

St. George² states that, among 21,000 autopsies performed at Guy's

¹ American Journal of the Medical Sciences, 1921, **161**, 824.

² *Ibid.*, **162**, 556.

Hospital, the tricuspid valve was found involved alone only twelve times while among 6800 autopsies at Bellevue Hospital only 4 instances of primary tricuspid involvement were discovered. The bacteria present in these cases were of various types. In almost every instance there were embolic abscesses, and these frequently had led to a diagnosis of bronchopneumonia. The prognosis is apparently extremely unfavorable and the life expectancy is not more than two or three months from the onset of symptoms. St. George gives the details of 5 cases.

Lutembacher¹ has recently reported the details of a case of pneumococcus pneumonia in a man of sixty-four years of age. At first, the picture was simply that of pneumonia, but endocarditis was soon superadded and death resulted. At autopsy, fresh vegetations were found on the tricuspid valve.

ENDOCARDITIS DUE TO THE NON-HEMOLYTIC STREPTOCOCCUS has received considerable mention in these pages in the past years, and little new concerning it has appeared in the recent literature. It is interesting, however, to see that the same salient points which have been emphasized in the English literature of late years are receiving attention in other parts of the world. Gessler² employs the term "slow endocarditis" in describing a group of 33 of these cases. As usual, the onset was insidious, there was an irregular febrile reaction, and characteristic kidney findings and anemia were present in addition to the cardiac lesions. Somewhat surprising is Gessler's statement that in 31 of the 33 cases there was aortic involvement; this percentage seems high. Morawitz³ writes in much the same vein. He emphasizes the frequency with which this condition is overlooked or incorrectly diagnosed. Often tuberculosis is suspected, or the diagnosis is simply one of anemia; at other times, because of the fever and the splenic enlargement, malaria is suspected. The cardiac murmurs are sometimes overlooked, sometimes ignored, and sometimes explained as being due to the anemia. He further emphasizes the diagnostic significance in addition to remittent fever, splenic tumor, anemia, and cardiac murmurs specially of aortic origin, of hemorrhagic nephritis, and the appearance of spontaneously developing aneurysm at unusual points. All of these features should suggest "endocarditis lenta," and the diagnosis once thought of is often surprisingly clear.

Similar is the paper by Sison, Bautista and Lantin⁴ in which 3 such cases are reported.

The other organism which can produce a clinical picture identical with that caused by the non-hemolytic streptococcus is the influenza bacillus. As a cause of so-called subacute endocarditis, however, the influenza bacillus is very rare; it has been said to be responsible for about 5 per cent of cases, but few carefully studied cases have been reported. Cohen and Greenberg⁵ have recently detailed an instance in a man, aged forty-five years. During the study of the case two blood cultures

¹ Paris médicale, 1921, **11**, 85.

² Medizinische Klinik, 1921, **17**, 1476.

³ München. med. Wehnschr., 1921, **68**, 1478.

⁴ Journal of the Philippine Islands Medical Association, 1921, **1**, 185.

⁵ Journal of the American Medical Association, 1922, **78**, 1382.

were positive for influenza bacilli and at autopsy small friable vegetations were found superimposed on old, well-organized firm vegetations on the mitral valves. These recent vegetations showed some ulceration. On the aortic leaflets similar, but much less marked, vegetations were found. The spleen was enlarged four or five times its normal size and contained a number of infarcts, as also did the kidneys. It is interesting to note how closely the clinical picture presented by this case simulated that of non-hemolytic streptococcus endocarditis. There was the peculiar skin pallor, the splenic tumor, microscopic blood in the urine, and later pectechiae appeared and cardiac murmurs became audible. Throughout the course the fever was high and very irregular; the whole illness from the first chill to death occupied only about five weeks.

SPLENIC ENLARGEMENT, as a diagnostic sign in endocarditis due to the nonhemolytic streptococcus, has received scant attention and inadequate emphasis. Although its frequent occurrence has been mentioned in all important articles on this subject, yet the discovery of an enlarged spleen in the individual case is, it seems, more often than not used as an argument in favor of some other diagnosis than endocarditis. A recent statistical study on this subject by Arnett¹ is therefore of considerable value.

Arnett grouped a series of cardiac cases, each of which had been autopsied, under the headings (1) "recent acute endocarditis," (2) "chronic cardiac disease," and (3) those with evidences of a chronic process and an acute process in addition, which he referred to as "recurring endocarditis." For comparison, a group of noncardiac streptococcic infections were also studied. In these four groups of cases the frequency and degree of splenic and hepatic enlargement were noted and also the relationship of splenic infarction and splenic enlargement. Tables VII and VIII show the interesting results.

TABLE I.—RELATIONSHIP OF SPLENIC INFARCTION AND ENLARGEMENT.

Diagnosis.	Spleen.				Liver.		
	Number cases.	Number enlarged.	Percentage enlarged.	Degree of enlargement, ³ per cent.	Number enlarged.	Percentage enlarged.	Degree of enlargement, ³ per cent.
Recent acute endocarditis . .	57 ²	29	50	241	14	25	69
Recurring endocarditis . .	88	45	51	236	26	30	58
Chronic cardiac disease . .	87	20	23	146	15	17	40
Non-cardiac streptococcic infections . .	54	24	44	129	17	31	55
Total . .	286	118			72		

¹ American Journal of the Medical Sciences, 1922, **163**, 590.

² Fractions are omitted, the nearest integer being used.

³ Under this head are included only organs whose numerical weight or size was given.

TABLE II.—FREQUENCY AND DEGREE OF SPLENIC AND HEPATIC ENLARGEMENT.

Diagnosis.	Number cases.	Infarcts.	Percent- age hav- ing in- farcts.	Infarcts without enlarge- ment.	Infarcts with en- large- ment.	Percent- age of enlarged spleens infarcted.	Percent- age of infarcted spleens enlarged.
Recent acute en- docarditis . .	57	21	37	7	14	48	67
Recurring endo- carditis . .	88	23	26	8	15	33	65
Chronic cardiac disease . .	87	8	9	6	2	10	25
Non-cardiac streptococcic infections . .	54	3	6	1	2	5	77

It is obvious that if the enlarged spleen of endocarditis were due to back pressure alone it might be expected that a greater enlargement would be found in chronic cardiac disease than in acute or recurring endocarditis. As Arnett points out, this is not the case. Furthermore, splenic enlargement is more frequent and more marked in noncardiac streptococcic infections than in chronic cardiac disease. Similarly, infarction cannot be blamed for the splenic enlargement in any large number of the cases, for in less than half of the cases in which splenic enlargement occurred, was infarction found. From these figures, Arnett seems justified in his conclusion:

"The spleen was often found greatly enlarged in patients who had died of acute or recurring endocarditis, and this enlargement occurred independently of liver enlargement. Splenic enlargement was also frequently found in cases with noncardiac streptococcic infection and about half as frequently in chronic cardiac disease. Although it is impossible to arrive at any final conclusion as to the cause of splenic enlargement in acute and recurring endocarditis, the evidence points toward infection rather than back pressure or infarction as being the factor of most importance in causing the spleen to enlarge. Splenic enlargement is an important diagnostic sign in acute and recurring endocarditis, and is frequently overlooked in the physical examination.

Chronic Valve Lesions. MITRAL STENOSIS is still much under discussion, both as to the mechanics of the production of the murmur and accentuated first sound, and also as to the etiology of the condition. Henderson¹ reports some experiments carried out with excised heart valves and also some observations made on the heart of a patient with mitral stenosis. It was found that the fused valve leaflets form a baggy funnel which has to be flattened out and made taut before ventricular systole can commence to effectively discharge any blood into the aorta. This lost motion is probably an important factor in diminishing the mechanical efficiency of the heart. In the heart studied by Henderson the baggy valve funnel was of such dimensions that in order to discharge

¹ Journal of the American Medical Association, 1922, **78**, 1046.

26 cc of blood into the aorta the left ventricle would have to make a contractile effort equivalent to at least 100 cc. Henderson suggests that this tightening of the previously slack partition formed by the baggy mitral valve leaflets is the cause of the thrill and rumble characteristic of mitral stenosis.

As to the time of the thrill and murmur of mitral stenosis there is also some argument. Reid¹ and others have maintained that the murmur is of ventricular origin and that it occurs "before the systolic sound but not before the beginning of (ventricular) contraction." Henderson points out that the period during which ventricular contraction is overcoming the slack, baggy mitral leaflets would actually be part of systole, but would not be so recognized by the clinical observer, since none of the ordinary signs of systole would as yet have occurred. With the taking up of the slack in the mitral leaflets would be heard the so-called "presystolic rumble" terminating in the snapping sound as the baggy funnel became taut. Thus, according to this theory, the sounds which we have been accustomed to consider presystolic actually occur during, and because of, ventricular systole, but before the systolic contraction of the ventricle becomes effective or is recognizable. This theory is attractive and highly plausible; it does not, however, seem to fit in very satisfactorily with the well-known disappearance of the mitral stenotic murmur which occurs with the onset of auricular fibrillation.

While acute rheumatic fever is, of course, responsible for the vast majority of instances of mitral stenosis, there are those who continue to emphasize the occurrence of this valve lesion as a congenital fault, and others who insist on the part played in its production by syphilis. Neither of these two views has received as much attention in this country or in England as elsewhere.

For example, Taillens² accepts congenital mitral stenosis without doubt, and points out that it may exist for many years without symptoms until some special strain, such as military training, makes it apparent.

Concerning the part played by syphilis, Hahn³ claims to have found, in a series of 130 instances of congenital syphilis and fetal syphilis that 80 to 90 per cent of the cases had an uncomplicated mitral stenosis. He believes that the stenosis is an evidence of retarded growth and states that Fournier agrees with this view.

Tuohy⁴ and also Clark⁵ remind us that mitral stenosis is the form of valvular disease which is most often complicated by auricular fibrillation. This is specially true of persons under the age of forty. Once the auricle has commenced to fibrillate the classical thrill and murmur of mitral stenosis is more or less markedly disturbed. Often both thrill and murmur are lost and the diagnosis of the valve lesion may become very difficult. Clark also emphasizes the dangers of the implantation of bacterial infection on the valve stenosed by previous rheumatism

¹ Journal of the American Medical Association, 1921, **77**, 1646.

² Archives médicales de Belges, 1921, **74**, 705.

³ Zentralblatt für innere Medizin, 1921, **42**, 818.

⁴ Journal-Lancet, 1922, **42**, 23.

⁵ Brazil-Medico, 1921, **35**, 245 (Abstract, Journal of the American Medical Association).

and quite properly lays stress upon the measures which may be taken to lessen this danger by the eradication of all foci of infection in the body.

AORTIC REGURGITATION has received but little attention in the recent literature. Its etiology has been discussed in several articles. Nobécourt¹ quite properly points out that aortic lesions developing in childhood are almost invariably of rheumatic nature, while Russell-Wells² reminds us that after the age of forty, arteriosclerosis and syphilis are the main causes. He mentions the very rare form of aortic incompetence which results from an actual rupture of a cusp of the valve by violence. Such a case has been recently reported by Wolvius³ as occurring from extreme physical exertion incident to a weight-throwing contest.

The diagnosis of aortic regurgitation is easy when the classical signs are well developed; the basal diastolic murmur, the enlargement of the heart downward and to the left, visibly pulsating arteries, Corrigan's pulse, capillary pulse, and Duroziez's murmur form an unmistakable picture. In early cases, however, greater care in examination must be exercised. Brockbank⁴ teaches the following rules for the examination of the heart of every patient: Ascertain as accurately as possible, by palpation and percussion, the position and nature of the cardiac impulse and apex-beat, always feeling for the latter well out toward the axilla. He assumes invariably that aortic valvular disease is present whenever, with no increase in blood-pressure, there is any enlargement of the left ventricle with forcible impulse and the heart's action is moderately slow and regular. When these conditions are found one should, with great care, search for auscultatory evidence, and one should listen not only over the aortic area itself but also down the left border of the sternum and over the tricuspid region.

Broomhead,⁵ in commenting on Brockbank's views, gives the following figures concerning the relation of rheumatism and syphilis to aortic regurgitation and mitral stenosis:

TABLE IX.

	Cases.		Per cent.
Aortic regurgitation, 121 cases:			
Admit syphilis	24	=	19.84
Wassermann reaction strongly positive	30	=	24.79
Wassermann reaction positive	17	=	14.05
Rheumatic fever	28	=	23.14
Chorea			
Rheumatism			
No history of syphilis	22	=	18.18
Wassermann negative			
No history of rheumatism			
Mitral stenosis, 97 cases:			
Admit syphilis	9	=	9.28
Wassermann strongly positive	9	=	9.28
Wassermann positive	8	=	8.25
Rheumatic fever	59	=	60.82
Chorea			
Rheumatism			
No history of syphilis	12	=	12.37
Wassermann negative			
No history of rheumatism			

¹ Arch. de méd. des enfants, 1921, **24**, 393.

² Practitioner, 1922, **108**, 77.

³ Nederl. Tijdschr. f. Geneesk., 1921, **2**, 1680.

⁴ British Medical Journal, 1922, **1**, 181.

⁵ Ibid., 266.

These figures merely give evidence in statistical form of what has been said, and although the number of cases is small the results are very interesting and instructive.

Diseases of the Pericardium. In the review last year I quoted some statistics collected by Lyter¹ concerning the occurrence of chronic adhesive pericarditis. Thirty instances of pericardial adhesions were found in a series of 514 consecutive autopsies. This year there is available an interesting study by MacLachlan² on the incidence of pericarditis in a series of 975 autopsies. In this series some form of pericarditis was present in 100 of the 975 bodies examined or an incidence of approximately 10 per cent.

Acute pericarditis was the form found in 5 per cent of the necropsies. Of these 50 cases of acute inflammatory change in the pericardium, almost three-quarters showed 50 cc or less of fluid in the sac while but one-seventh had more than 100 cc of fluid present. This clearly emphasizes the frequency with which the diagnosis of acute pericarditis has to rest on other evidence than changes in percussion outline or roentgenographic shadow. In 10 instances the acute pericarditis occurred together with acute endocarditis; in another 10 instances it was associated with lobar pneumonia in a series of 128 cases of this latter disease; 7 times the pericarditis was secondary to infection arising from the peritoneal cavity. Only one case of acute pericarditis was present in 50 autopsies on epidemic influenza.

Chronic pericarditis was found in 40 cases, or 4 per cent, of the whole series; these adhesions were general in 17 instances and local in 23. Tuberculous pericarditis was found in 10 cases, or 1 per cent. Among these tuberculous cases were found the largest pericardial sacs, filled with large amounts of fibrin and fluid. Tubercles were seldom found alone, and at first glance the appearance was simply that of an acute fibrinous pericarditis, but after the fibrinous exudate is scraped off the tubercles are usually readily seen. Whether or not some of the adhesive forms are healed instances of tuberculous pericarditis, as was suggested by Wills, is still uncertain. MacLachlan believes that tuberculous pericarditis is always secondary to some other focus of this infection, but that the pericardial involvement bears little relation to the extent of the tuberculous process elsewhere. In other words, it is often a purely local entity in the same sense as tuberculosis of the peritoneum or meninges is. In many cases of fatal pulmonary tuberculosis, however, the pericardium escapes all involvement.

MacLachlan also emphasizes from this series the frequency with which the diagnosis of pericarditis, either acute or chronic, is missed until it is revealed at the necropsy table.

PERICARDITIS IN CHILDHOOD. In the above series there were few children, but other authors in the past year have touched on the occurrence of pericarditis in childhood.

Baumel³ has emphasized the insidious onset of pericarditis in child-

¹ PROGRESSIVE MEDICINE, September, 1921, p. 127.

² American Journal of the Medical Sciences, 1921, **162**, 654.

³ Médecine, 1921, **2**, 843.

hood, and specially in cases in which there has been a left-sided pleurisy. Poynton¹ reports that in an analysis of 100 fatal cases of suppurative pericarditis of all varieties he found that 84 per cent of the patients were under four years of age. Fifty-four of the cases were associated with empyema and 31 with pleurisy or pneumonia. In only one instance was the pericarditis an isolated event.

Poynton discusses every aspect of pericarditis in childhood. Nobécourt² in writing on this same subject lays stress on the frequency of rheumatism as the etiology of acute pericarditis in childhood.

Simulation of appendicitis by acute pericarditis in children is described in a recent article by the late M. H. Fussell and J. A. Kay.³ The authors describe 3 cases of acute pericarditis in children: 1 with a purulent exudate, and the other 2 apparently without pericardial effusion, which were positively diagnosed as appendicitis. In one an operation was ordered but was not performed. A fourth case seen by Fussell developed abdominal symptoms significant of appendicitis and was operated upon. The appendix was found mildly inflamed, but immediately after the operation the child developed a well-marked pericarditis. In this instance both appendicitis and pericarditis were present.

Because of the importance of this subject it seems justifiable to quote 1 of the 3 case histories in full.

CASE III.—M.B., aged seven years. Father and mother living and well. Four brothers dead; one of diphtheria, one of meningitis and one was stillborn. Four died of gastroenteritis. No other boys are living. One sister living, none dead. The patient was admitted to the children's ward of the Protestant Episcopal Hospital November 7, 1920.

Personal History. Had measles and whooping-cough five years ago. Two months ago had an attack of acute rheumatism and one month later had tonsillitis. No other illnesses. No operation or injuries.

Present Illness. The chief complaint was pain in the abdomen. Began about three days ago with fever and vomiting, but when it began there was no pain in the abdomen. On the second day his condition continued the same; the child was more feverish and complained somewhat of shortness of breath. On the third night he began to complain of pain in the abdomen. The mother does not know whether pain was localized or diffuse. Vomiting continued. The mother stated that the child had vomited twenty times during the day. The bowels moved four times during the fourth day.

Examination. The patient was a well-developed young child. Had rapid breathing, with the face slightly flushed, and a short cough. Head negative, face congested, and teeth in fair condition. Breath sounds are lessened over the left lower lobe laterally. Heart shows a very loud mitral murmur. The abdomen seems tender on both sides. No rigidity.

The pulse is rapid; the precordia is bulging. The abdomen is normal in shape. The cardiac impulse is diffuse over the precordia; the apex-

¹ British Medical Journal, 1921, **2**, 583.

² Paris médicale, 1921, **11**, 18.

³ American Journal of the Medical Sciences, 1922, **163**, 40.

beat is at the upper line of the fifth interspace. Heart dulness extends to the midline of the sternum, to the anterior axillary line and apparently runs up to both clavicles. Higher pitched note over the left clavicle than over the right. Typical pericardial friction is heard. A systolic murmur also is heard in the mitral area. Breath sounds are much louder in the left axilla than in the right, in addition to what appears to be a pericardial friction rub, a pleuropericardial murmur is heard at the angle of the left scapula. The lungs are apparently normal. No tubular breathing and no bronchophony. The abdomen is resistant, distended, and tender. There is most marked tenderness and resistance in the region of the appendix. So great and prominent are the appendicular signs that the surgeon in consultation made a diagnosis of appendicitis. Peristalsis is present.

February 4, 1920. Friction is evident and superficial. Tubular breathing posteriorly over the left chest at the angle of the scapula. Vocal fremitus is increased.

February 5. The abdomen is soft; no pain. All the abdominal symptoms have disappeared.

February 8. Blowing breathing at the angle of the left scapula still continues. There are no signs of abdominal distention today, Pericardial friction is still evident.

February 9. Dulness over the right edge of the sternum at the upper border of the second rib, just outside of the nipple line. Still area of dulness at the angle of the scapula. Still blowing breathing and bronchophony.

February 11. Pulse is rapid and feeble. Friction sound is evident in front. Dulness in the right axilla. Blowing over practically the whole base posteriorly.

February 13. Tap of the pericardium in Rotch's notch positive today and 35 cc of fluid were removed. Heart dulness is to the right of the sternum in the axillary line. Heart action still rapid. Friction still present; not as much blowing as yesterday. Still marked blowing at the angle of the scapula.

February 14. Patient's condition is much worse. Breathing is more labored; pulse is imperceptible; face is pale. Cyanosis around the lips. Rales in the chest. Heart sounds indistinct.

At 3.30 P.M. the patient's condition is unimproved. Died at 5.20 P.M.

Autopsy. The heart was found to be enlarged. There was no fluid in the pericardium; there was a typical "butter-fat" appearance of the exudate in the pericardium. The pericardium was adherent to the lung posteriorly. The appendix was normal and there was no evidence of past or present inflammatory condition.

PERICARDITIS IN CHRONIC NEPHRITIS has been thoroughly reviewed by Barach¹ in a most interesting article. He reminds us that Bright, in 1836, found pericarditis in 8 of 100 autopsies performed on cases of renal disease, and that Taylor, in 1845, stressed its occurrence in chronic nephritis. Various statistics give the incidence of pericarditis in nephritis

¹ American Journal of the Medical Sciences, 1922, 163, 44.

as from 4.5 per cent to 14 per cent. Gibson, in 1691 collected cases of nephritis and found the incidence 8.1 per cent.

Barach found 18 instances of acute pericarditis among 162 cases of nephritis, or an incidence of 11.1 per cent. During a corresponding period 30 clinical cases of pericarditis were recognized among 929 cases of nephritis, or 3.2 per cent. These 30 cases were carefully studied and it was found that the group was characterized by a marked nitrogen retention in the blood, a constantly present acidosis, a high blood-pressure, severe secondary anemia and a tendency to hemorrhage. The average figures for the 30 cases were as follows: blood-pressure: 214 systolic, 136 diastolic; red blood cells 2,738,000; hemoglobin, 48 per cent; white blood cells, 15,900; blood urea, 2.69 grams per liter. In all of the 16 cases in which observations were made a lowering of the plasma bicarbonate was present. The average 'phthalein elimination in 20 cases was 5.9 per cent; in one-half of these it was zero. Twenty-one of the 30 cases manifested, in one way or another, a tendency to hemorrhage.

Except in one case the diagnosis was made by the presence of pericardial friction and not by the signs of effusion; the diagnosis was made clinically in 90 per cent of the cases. After the pericarditis had been recognized the average duration of life, excluding one patient that lived one year, was sixteen days.

Special interest centers in Barach's attempts to determine the cause of the pericarditis in these cases of nephritis. Very diverse views have been expressed in the past; some have maintained that chemical irritation is responsible, others that a secondary infection is present. Admittedly, it is difficult, if not impossible, as a rule, to demonstrate any organisms by smear or culture. In Barach's series, culture of the pericardium yielded pyogenic organisms in 4 cases, and in 4 other cases the cultures were sterile. In the infected cases the cellular infiltration of the pericardium was chiefly of the polynuclear type; in the sterile cases the infiltration was predominantly of mononuclear types. Barach believes, although in a few cases the pericarditis is frankly infectious, that the majority of instances are noninfectious and may well be due to chemical irritation incident to the alteration in the chemical composition of the patient's blood.

In coming to this conclusion, Barach seems to place little weight on the leukocytosis which is present in many of his cases and which would seem perhaps to favor an infectious rather than a chemical cause for the pericarditis. In 5 cases the white cell count exceeded 20,000, and in 5 more exceeded 18,000. The count was below 10,000 in only 3 of the 29 cases in which it was recorded.

A NEW SIGN FOR THE DIAGNOSIS OF PERICARDITIS with effusion in children has been recently described by Haas.¹ He claims that by outlining the cardiac dullness in the usual manner with very light percussion one obtains the outer border of the pericardial sac. Then by placing the bell of the stethoscope against the chest wall at approximately the center of this area and stroking or tapping with the tip of a finger or pencil

¹ Journal of the American Medical Association, 1921, **77**, 1969.

from the periphery toward the stethoscope a second line within the first will be obtained. This inner outline will roughly parallel the outer, but will more strongly suggest the shape of the heart. Repetition of this procedure usually shows a change in the outer lines from day to day in a case of pericardial effusion, either in the direction of extension or contraction, whereas the inner lines remain more or less constant. In a case without effusion the double lines are not obtained except occasionally along the left border.

PERICARDITIS WITH EFFUSION has continued to receive attention in the literature. Two years ago there was given in this review a fairly full account of C. S. Williamson's¹ experimental study of pericarditis with effusion, and emphasis was placed on the importance of his observations concerning the localization of fluid in the pericardial sac; the effect of such fluid accumulation on adjacent organs, specially the liver, and the frequent persistence of an audible friction over the front of the heart in spite of the presence of considerable fluid.

More recently, Williamson² has published a clinical study of 23 cases of pericarditis with effusion in which he has tested out the conclusions drawn from his experimental work, with very gratifying results. He was able to confirm the fact that the fluid accumulates earliest in the costo-diaphragmatic angle of the pericardial sac and that this accumulation is manifested clinically, in all but very small effusions, by a pushing down of the left lobe of the liver. This displacement of the liver can nearly always be observed and made use of for diagnostic purposes before any rounding of the cardiohepatic angle or any increase in the great vessel dullness occurs. With an effusion of 500 to 600 cc the edge of the liver is depressed about two finger-breadths.

Also confirmation was obtained for the persistence of a pericardial friction rub in about two-thirds of the cases with fairly large effusions. This is especially true when, for any reason, there is a disproportionately large heart, so that this organ comes into close apposition with the sternum.

Williamson³ has also presented a more detailed study of 4 cases of pericarditis with effusion in which the early depression of the left lobe of the liver proved to be of great diagnostic help. It antedated the development of dullness in the fifth right interspace (Rotch's sign) or the rounding of the hepatic angle (Ebstein's sign). He advises that the lower margin of the liver be determined by light percussion in the median line, and that this should be carefully done and the result recorded in all cases in which the development of a pericarditis is probable. Only when one has done this can a slight change in the level of the liver margin subsequently be appreciated. One must be on guard not to be deceived by an enlargement of the liver due to passive congestion from a failing heart. When exploratory puncture is to be performed, Williamson prefers to go in just outside the apex, directing the needle upward, inward, and backward toward the hilum of the lung. By this method

¹ Archives of Internal Medicine, 1920, **25**, 206.

² Journal of the American Medical Association, 1921, **77**, 2050.

³ Medical Clinics of North America, 1921, **5**, 15.

if the heart is wounded it will be the thick-walled left ventricle and little harm will result.

Treatment of Pericarditis with Effusion. Hedblom¹ advises that exploratory pericardiocentesis be performed with a short hypodermic needle, and infiltration of the tissues with procain as the needle is introduced. The point of election seems to be in the region of the left mammary line, fifth interspace, just inside the left border of dulness. He reminds us that a negative aspiration at any one point, especially at the left sternal border, does not exclude the presence of fluid. Preliminary partial evacuation of any exudate may probably be accomplished during exploration through an aspirating needle and small syringe. When a sterile exudate recurs it should be evacuated through a needle as often as necessary, but an infected exudate usually requires open drainage of the pericardium.

Hedblom² gives the details of 9 cases of pericarditis with effusion which have been treated surgically at the Mayo Clinic. Four were of a simple serous type and only aspiration through a needle was performed. This procedure led to improvement in three instances. Two of the improved cases died within six months, probably of generalized tuberculosis.

In the suppurative cases, 3 were due to a hemolytic streptococcus; one followed an operation for epithelioma of the lip; one a thyroidectomy for adenoma. In this latter case bilateral empyema was also present.

A recent case which I was asked to see on the surgical service at the University Hospital presented certain points of interest in connection with the etiology and treatment of pericarditis. The patient, a boy, aged fourteen years, had some weeks previously had an attack of what was considered an influenzal pneumonia. Following this he failed to convalesce and was sent to the hospital with the diagnosis of right-sided empyema. The ward resident physician, on routine examination, discovered a marked pericardial friction heard over the whole body of the heart. On this account I was asked to see the patient in consultation. On the way to the ward I commented upon the relative infrequency with which pericarditis develops secondary to empyema on the right side as compared to empyema on the left. On examination, however, the reason in this instance for the pericarditis was clear. The empyema was loculated anteriorly over the lower half of the upper lobe of the right lung and immediately against the right border of the heart dulness. The pericardial frictions were loud, rough and unmistakable. A roentgenogram confirmed the location of the empyema and showed no enlargement of the cardiac shadow or change of shape. Aspiration anteriorly in the third interspace secured pus. Operation was performed and a considerable collection of pus was evacuated; no observations could be made concerning the pericardium. However, within a week after the operation the friction disappeared without any evidences of pericardial effusion appearing and the patient made a complete recovery. In this instance the relief of the empyema which, by contiguity, had led to the pericardial inflammation, was sufficient to bring about a halt in the process in the pericardial sac.

¹ Minnesota State Medical Association, Meetings of August, 1921.

² Minnesota Medicine, 1922, 5, 40.

Curiosities of pericardial disease include calcification and neoplasms. Instances of the former are reported by Alessio¹ and by Ronneaux.² In the one instance the calcification was found at autopsy on a woman, aged twenty-three years, who had succumbed to cardiac disease and who had had fluid accumulations in the peritoneum, pleural sacs and pericardium. In the other instance the calcification was diagnosed by a roentgenologist in a patient with tuberculous pleurisy.

Carcinomatous involvement of the pericardium is not common. A man of forty-nine, with a swelling of the right parotid gland, died suddenly, and, according to Cleland and Palmer,³ who have reported the case, the pericardial sac was found at autopsy to be distended with bloody fluid. Small granulations covered the surface of the auricles and sections showed these to be of carcinomatous nature.

TUBERCULOUS PERICARDITIS has been mentioned several times in this review, but an article by Hedblom⁴ deserves special comment. He reports a case of what he considers to be primary tuberculous pericarditis by which he means that it was proved to be tuberculous in nature and clinically appeared to be primary. He has also collected from the literature since 1897, 7 cases in which at necropsy a tuberculous pericarditis was found, but in which no trace of tuberculosis could be made out either in lymph glands or in organs. Full references to the literature are given.

Tuberculous pericarditis is not uncommon in association with tuberculosis of the lungs or lymph glands, and Hedblom goes so far as to suggest that most cases of pericarditis that cannot be proved to be pyogenic are tuberculous.

"Whether the movements of the pericardial fluid with the beats of the heart vary the resistance to the current and are the cause of the curves in electrocardiography?" is the bizarre question asked by Stephens.⁵ He presents no evidence which seems to justify a suggestion so entirely foreign to the usual accepted views on this subject.

ARRHYTHMIA AND ELECTROCARDIOGRAPHY. The literature in these allied fields continues to appear in large volume, and in the second instance, specially with greater evidence of being of only specialized interest. Few attempts are made in the current literature to present this material in such a manner as to make it available to the uninitiated.

An attempt to present the electrocardiographic side of the question in simple and yet complete form has appeared as a 188-page book by Willius.⁶ This is no doubt a useful work, but even it cannot make this complicated and still unsettled subject easily understood. The many reproductions of tracings and the frequent use of diagrams help considerably.

Much of the energy of electrocardiologists in the past year or two has been devoted to the study of the action of the drug quinidine and its

¹ Gazzetta degli Ospedali, 1921, **42**, 623.

² Soc. franc. d'electroth. et de radiol., March 28, 1921.

³ Medical Journal of Australia, 1920, **1**, 233.

⁴ Surgical Clinics of North America, 1921, **1**, 1411.

⁵ Practitioner, 1921, **106**, 109.

⁶ Clinical Electrocardiography, Saunders & Co., 1922.

influence on auricular fibrillation. This will be discussed under the heading of treatment.

NEUROGENIC IRREGULARITIES OF THE HEART. In an article concerning the nature and significance of heart symptoms, Mackenzie¹ points out that the mechanism concerned in regulating the heart-beat is formed of an extrinsic part connected to the nervous system by the vagus and sympathetic nerves, and an intrinsic, which includes the sinoauricular and auriculoventricular nodes, and the Purkinje cells in the bundle of His and in the auricle and ventricles. It is important that we should keep in mind the influence on the cardiac action which the extrinsic connections may bring to bear.

Wedd² has recently reviewed this subject. He points out that the sinus node or "pacemaker" of the heart is under the control of two mutually antagonistic forces, the autonomic and the sympathetic nervous systems. Therefore the activity of the pacemaker at any given moment is a resultant of these two forces, and a lack of balance between the two systems may bring about the so-called "sinus arrhythmia."

Sinus arrhythmia is common in children and is regarded as an expression of instability of the incompletely developed nervous mechanism of the child's heart, and hence is considered to be of no importance. In the adult, however, the occurrence of this type of arrhythmia is variously interpreted by different authorities. Willius states that while it is *per se* not indicative of organic heart disease it may be associated with change in the heart of a very serious nature. Webb suggests that in abnormal conditions of the heart or aorta, impulses may form which reach the extrinsic nervous system, and, acting through it on the pacemaker, become manifest as disturbances of the cardiac mechanism.

One sees, therefore, that this arrhythmia, unimportant as it apparently is in youth, may be of some significance in older individuals. Webb reports a case of sinus arrhythmia in a male, aged forty-eight years, who suffered from frequent attacks of "giddiness," and from dyspnea on exertion, numbness in the arms and hands and fatigability. The patient was slender, and had cyanotic lips and extremities. At the apex of the heart the first sound was weak and at the aortic area a soft systolic murmur was heard. There was a marked sinus arrhythmia. Blood-pressure, 112/72. The heart-rate was 50, which increased, after a few days of rest in bed to 70. Exercise test did not increase the sinus arrhythmia, but extrasystoles appeared. The patient soon was able to resume work in the hospital.

In many children the autonomic nervous system is overexcitable and such individuals exhibit unusual responses in the domain of the vagus nerve to ordinary happenings which would not disturb those with better balanced systems. Doxiades and Hamburger³ claim that such children about the age of twelve may develop ventricular extrasystoles which the authors consider merely an evidence of an overexcitability of the myocardium and not due to organic heart disease.

¹ British Medical Journal, 1922, **1**, 551.

² American Journal of the Medical Sciences, 1921, **162**, 49.

³ Jahrbuch für Kinderheilkunde, 1921, **95**, 276.

Rest and quiet will usually perpetuate and exaggerate the trouble, while exercise, combined perhaps with the administration of calcium chloride, will cause the disappearance of the extrasystoles within a week or two. Subsequent examination of such cases fails to reveal any organic heart disease.

PAROXYSMAL TACHYCARDIA. In the vast majority of cases, if not in all, the impulse to contraction in this disorder of the heart-beat arises outside the normal pacemaker of the heart. Willius believes that there does occur a form of paroxysmal sinus tachycardia, but others do not agree with this view.

L. E. Viko and P. D. White¹ have reviewed 3 cases illustrating points of interest in paroxysmal tachycardia—its relative unimportance in prognosis of life and activity, its relationship to auricular flutter, and the futility of administering digitalis in its treatment. The first patient, a Russian Jewish housewife, aged twenty-nine years, complained of attacks of palpitation and "skipping of beats." These attacks were frequent; lasted from five to ten minutes; came on and passed off very quickly, the heart-rate changing from slow to rapid or the reverse within a few seconds. She had been more nervous recently and noticed that the attacks were more apt to come on when she is nervous or when she "thinks about her heart." On examination no evidence of endocardial or myocardial disease was found; in every respect she was found to be healthy, but nervous. She had been receiving digitalis, but this was omitted, and the situation carefully discussed with the patient. Three weeks later she reported feeling very much improved and had had no attacks of tachycardia and recently no "skipped beats."

Case II was one of paroxysmal tachycardia occurring at frequent intervals, over twenty-five years, in a man constantly at hard labor. Between the attacks there have been no cardiac symptoms and the attacks have not worried him, but recently, at the age of sixty-one, the attacks have been somewhat more frequent.

In Case III, a young woman, without etiology for heart disease (except possibly tonsillitis) and without any objective evidence of cardiac disease, began having attacks of paroxysmal auricular flutter at the age of thirty-seven. Finally, in the attack in which the patient came under the author's observation there occurred an interesting transition from auricular paroxysmal tachycardia to auricular flutter.

The authors suggest that it is quite likely that the focus in the auricle which had been the origin of the "ectopic" impulses of the attacks of paroxysmal tachycardia which had run at a rate of about 170 to 180 per minute had increased the rate of production of impulses until when the rate reached about 200 it set in action the so-called "circus movement" as an explanation of auricular flutter. In this case therapy was discouraging.

F. M. Smith² has reported some clinical observations on paroxysmal auricular fibrillation and flutter. They are grouped together because of the close relationship of the mechanism, their appearance in the same

¹ Medical Clinics of North America, 1922, **5**, 1479.

² American Journal of the Medical Sciences, 1921, **162**, 13.

type of cardiac conditions, and their similar clinical significance. Eleven clinical histories are detailed; in 6 instances the abnormal auricular action was fibrillation and in 5 it was flutter. Smith believes that many cases of lasting auricular fibrillation and flutter are preceded by short paroxysms of these conditions. Sometimes extracardiac conditions seem to play a part in precipitating paroxysmal auricular fibrillation and flutter; of these extracardiac conditions, focal infections and hyperthyroidism seem to be the most important.

Up to the past few years, auricular flutter, with rapid regular rhythm, was not differentiated from paroxysmal tachycardia, but the differentiation is now insisted on. When the rhythm is regular and the rate over 140 per minute the clinician must differentiate between a simple tachycardia due to infection, toxemia or nervousness and either paroxysmal tachycardia or auricular flutter. Flutter rarely develops in undamaged hearts, and change of position, mild exercise or vagus pressure will often change both the rate and rhythm. With paroxysmal tachycardia the rate will not change, but the paroxysm may cease entirely after vagus stimulation.

Daniélopolu and Danulesco¹ describe the occurrence of paroxysmal auricular tachycardia following an injection of adrenalin.

Bernstein² describes an attack of paroxysmal tachycardia of fourteen and a half days duration. The onset occurred while the patient was in bed in a hospital, the onset being marked by an increase in the pulse-rate from 100 to 288 a minute. For the whole period of the attack the rate never fell below 180. No tracings are given nor is any data furnished from which the exact nature of the attack can be determined. The paroxysm ended during a period of digitalis administration, but this is sometimes seen with true paroxysmal tachycardia, although digitalis has no effect on the rate unless the paroxysm ceases. Digitalis slows the rate of flutter.

HEART BLOCK is always suggested by a rate under 60 and the slower the rate the more probable is it that some degree of block is present. If the block is complete the rate is usually around 30 per minute, but it may be much slower.

The condition may be truly congenital, as is evidenced by the unique case reported by White, Eustis and Kerr.³ In this case the irregularity was recognized before birth. They also report another instance of probably congenital heart block, and from the literature collect a total of 11 instances of graphically proved congenital heart block and 1 probably congenital case proved by electrocardiogram.

An interesting report, only available in abstract form, concerns a mother and son, both of whom had bradycardia. Calandre⁴ refers to the condition as congenital bradycardia, but apparently considers that the son, whose pulse-rate had never been known to be over 40, was an instance of heart block.

¹ *Annales de Médecine*, 1921, **10**, 1.

² *Journal of the American Medical Association*, 1922, **78**, 1538.

³ *American Journal of Diseases of Children*, 1921, **22**, 299.

⁴ *Archives de Cardiologia y Hematologia*, 1921, **2**, 225.

In children, heart block is most often caused by diphtheria. S. Calvin Smith¹ has recently reviewed this subject; the following are some of the conclusions from his article.

"Pulse irregularities of convalescence may be expected to arise between the sixth and eighth day of convalescence in 28 per cent of the children affected with diphtheria.

"Of these convalescent abnormalities, 65 per cent consist of sinus arrhythmia and of a condition called sinoauricular block; 20 per cent consist of premature contractions; none of the three are accompanied by symptoms or signs of circulatory embarrassment, nor do they eventuate in serious circulatory disturbance.

"The remaining 15 per cent of convalescent irregularities consist of high-grade heart block, which is strikingly sudden in onset and accompanied by urgent cardiocirculatory symptoms; death therefrom may be expected within thirty-six hours. None of the patients survived.

"Acute heart block is without exception the only pulse abnormality which resulted fatally during the periods covered by these observations. Its occurrence may be anticipated when the patient is constitutionally inferior; when toxicity is profound or persistent during the earlier stages of diphtheria, and when the initial tachycardia is protracted.

"Acute heart block was not once observed early in the clinical course of patients in whom early diagnosis had been followed by early antitoxin treatment in therapeutic dose."

This would seem to be pretty strong additional evidence, if any were needed, of the value of antitoxin in the treatment of diphtheria.

The so-called "sinoauricular block" referred to is considered by Smith² to be a physiological manifestation in certain hearts.

Heart block may occur in a variety of organic diseased conditions of the heart, and Bishop³ believes that in some instances it exerts a favorable influence in counteracting the effect of auricular fibrillation. He reports an instance of a block of one branch of the bundle of His.

Heart block following trauma of the left chest is reported by Laubry⁴ and his associates. Following the trauma the heart beat rapidly and irregularly for one day, and then the rate fell to 40 per minute and has remained at that level ever since.

TERMINAL CARDIAC ARRHYTHMIAS are reported on by Dieuaide and Davidson.⁵ They say that because of the frequency with which death is dependent on cardiac failure the mode of death of the heart is a matter of considerable interest. It has been suggested that fibrillation of the ventricle, which is the rhythm found to occur in gradual cardiac death, may also be present in many sudden deaths of otherwise unknown cause. There have naturally been few electrocardiographic records at the moment of lethal exitus. The authors, however, were able to obtain terminal electrocardiographic records in three instances. In these records the general changes which occurred were a gradual slowing of

¹ Journal of the American Medical Association, 1921, **77**, 765.

² American Journal of the Medical Sciences, 1921, **162**, 575.

³ Journal of the American Medical Association, 1922, **78**, 1535.

⁴ Bull. et mém. Soc. méd. des hôp., 1921, **45**, 1363.

⁵ Archives of Internal Medicine, 1921, **28**, 663.

the cardiac rate with coincident lengthening of the intervals between the component parts of the complex. The normal pacemaker apparently lost control of the rhythm and apparently the auriculoventricular node assumed this function, while various abnormally irritable foci in both ventricles and auricles initiated impulses. These investigators conclude that it is probable that oxygen-want, and perhaps carbon-dioxide accumulation, following cardiac failure, underlie these abnormalities in such cases as the three which they present.

ELECTROCARDIOGRAPHIC NOTES. Buchanan¹ has studied the *S-T* interval in 1028 electrocardiograms and finds that the normal time period of the *S-T* interval ranges from 0.24 second to 0.28 second and that variations are common and independent of anatomical lesions. They are more dependent on cardiac rate and are more frequent in males than in females.

F. M. Smith² has made further observations on experimental lesions of the branches of the auriculoventricular bundle of the dog. He finds that complete bundle branch block produces characteristic electrocardiograms that are diagnostic of the lesion, but that cutting the smaller subdivisions, or even one or more of the main subdivisions, did not change the form of the *Q R S* group unless ventricular dilatation was produced by ligating branches of the coronary arteries. This suggests that functional change in the myocardium may influence the conduction of the impulse within the ventricle.

Treatment of Heart Disease. **PREVENTION.** In a Shattuck Lecture before the Massachusetts Medical Society, Emerson³ presented a strong plea for greater interest and activity in the prevention of heart disease. He speaks of it in terms of a practical problem and quotes the following figures: It is found that not more than 150 active cases can be adequately examined and followed up by one special class. What is considered adequate personnel for one class holding one session a week is:

One physician at \$3.00 an hour, \$450 a year.

One full-time registered nurse, \$1800 a year.

Clerical help at \$.50 an hour, \$100 a year.

In addition a small transportation fund is needed, but office space and equipment supplies, etc., can usually be provided in some existing dispensary plant. The potential good and saving which such a heart-prevention class can accomplish is inestimable, and when the relatively low cost is appreciated one realizes that the funds will be forthcoming from a generous public if only the physician will do his duty.

Emerson urges not to await the coming of patients into offices but to search for them among the presumably healthy and attack these disabilities before the patient is aware of them, and this through a development of a habit in the whole community to seek a thorough medical examination once a year for adults, twice a year for children under fourteen, and always after apparent recovery from any acute febrile disease.

¹ Archives of Internal Medicine, 1921, **28**, 484.

² Ibid., 453.

³ Boston Medical and Surgical Journal, 1921, **184**, 587.

In a review of what has been accomplished with 65 cases of potential heart disease in childhood who were under continuous observation for an average period of four and one-half years, St. Lawrence¹ comes to some interesting conclusions which are worth quoting in full:

"1. Sixty-five cases of potential cardiac disease in children were continuously observed for an average period of four and one-half years.

2. Forty-nine patients (75 per cent) remained free from evidence of cardiac disease during that time.

3. Of 25 patients with acute rheumatic fever in the series none contracted a lesion in the heart.

4. Of 9 patients with myositis, bone and joint pains (growing pains) and sore throat none contracted a lesion in the heart.

5. Sixteen patients (25 per cent) contracted a cardiac lesion while under observation.

6. In every case in which a cardiac lesion developed the clinical picture was dominated by chorea in a severe form. No patient contracted a lesion in the absence of this manifestation.

7. Of 41 patients with chorea in the series, 16 (39 per cent) contracted a lesion in the heart.

8. Measures of value in preventing disease of the heart are of greatest benefit when directed against acute rheumatic fever and myositis, bone and joint pains (growing pains) and sore throat.

9. Such measures have little, if any, value when directed against chorea.

10. In untreated potential cases, acute rheumatic fever is the most important factor concerning disease in the heart.

11. In potential cases under management, chorea is the most important factor concerning disease in the heart.

12. With the exception of mitral stenosis, cardiac lesions practically always occur during the active phase of a rheumatic manifestation or a period of pyrexia. In the absence of an active phase the physical signs in the heart remained unchanged.

13. Evidence of mitral stenosis may not appear for a year or more after the cessation of the rheumatic manifestations. It is therefore impossible to state, at the conclusion of an attack of acute rheumatic fever or chorea, that the heart was unaffected by these conditions.

14. Heart-rate may have a marked effect on the physical signs of mitral stenosis, as shown by a graphic record."

No more important or suggestive paper has appeared than this one, and it deserves to be read and pondered over by all who deal with such cases.

DIGITALIS. Christian² comes to the defence of the use of digitalis in chronic cardiac cases with regular rhythm and no great increase in rate. He quotes the views of Sir James Mackenzie, as published in *Oxford Medicine*, Volume II, pp. 487 and 488, that when the rhythm is normal only occasionally does digitalis slow the heart, and that to a very slight degree. Christian does not agree with these views. He believes

¹ Journal of the American Medical Association, 1922, **78**, 947.

² Medical Clinics of North America, 1922, **5**, 1173.

that digitalis, as a rule, has a striking effect on those changes in the patient which are brought about by cardiac insufficiency, and this effect appears irrespective of whether or not the pulse is irregular. Increased heart-rate with, and without, arrhythmia, dyspnea, cough, cyanosis, edema, decreased urinary output, nausea, vomiting, enlargement of the liver and pain are the prominent changes which occur in patients suffering from cardiac insufficiency, and Christian believes that alteration of some or all of these is to be looked for following digitalis therapy as evidence of effectiveness of the drug. He considers it the exception to fail to find definite evidence of a very considerable result from digitalis therapy provided signs of cardiac insufficiency were present prior to giving the digitalis, that the digitalis used is potent and given in sufficient amount, and that there has been a fair interval of time since any preceding digitalis therapy. In Christian's experience "digitalis is fully as effective in the treatment of chronic cardiac cases without auricular fibrillation as it is in those with auricular fibrillation. Even when the heart-rate is slow, striking digitalis effects may be produced whether fibrillation is present or not. If symptoms and signs of cardiac decompensation are marked it is rare to fail to get a digitalis effect irrespective of what the cardiac rhythm is."

Digitalis in diphtheria is considered to be contraindicated on account of its action in accentuating any tendency to heart block. For example, Smith¹ considers it absolutely contraindicated. On the other hand, Bie and Schwensen² report 2 cases which they believe indicate that early therapy with digitalis may so save the myocardium from overexertion that a fatal outcome is avoided. In one of their cases, however, death occurred a few days later after the development of partial heart block. The authors attribute this to progressive myocarditis, but others might see in it an undesirable action of digitalis.

Hamilton³ advises digitalis in the auricular fibrillation associated with hyperthyroidism. Christian⁴ states that in chronic myocarditis, digitalis is capable of accomplishing wonders up to the time the heart muscle becomes unable to respond further.

Studies on Digitalis. Macht and Bloom⁵ have studied in animals the cerebral symptoms produced by digitalis and find that the various digitaloids, even when given in comparatively small doses, produced a depression in the behavior of the animals. This depression was estimated by the behavior of rats in a circular maze. They state that Withering, the father of rational digitalis therapeutics, did not fail to note certain cerebral manifestations of digitalis, but that the most important contribution on this subject came from the eminent French physician Duroziez in 1874. Their experimental results confirm clinical experience in the matter.

Bliss⁶ studied fifteen samples of digitalis infusion purchased at random

¹ Loc. cit.

² Journal of Infectious Diseases, 1922, **30**, 308.

³ Boston Medical and Surgical Journal, 1922, **186**, 216.

⁴ Southern Medical Journal, 1921, **14**, 587.

⁵ Archives of Internal Medicine, 1921, **28**, 678.

⁶ Journal of Laboratory and Clinical Medicine, 1922, **7**, 225.

from retail pharmacies. The ten samples which had been prepared according to the method approved by the U. S. Pharmacopeia showed an average activity of 28.1 per cent. of the theoretical activity which the infusion should have possessed. Five samples prepared by an unapproved method showed an average activity of 62.6 per cent. The average activity of the whole group was 46.26 per cent of the theoretical activity calculated from the amount of standardized drug supposedly used in the manufacture of the infusion.

Marvin and White¹ studied the effects of two drugs belonging to the digitalis series; *apocynum* and *convallaria*. They conclude that *apocynum cannabinum* has, in some degree, a digitalis-like action in cases of heart disease with auricular fibrillation. Its possible usefulness in the treatment of heart failure, however, is markedly limited by the discomfort, nausea, and vomiting which Marvin and White found unvariably followed its use in doses sufficiently large to affect the heart. *Convallaria*, on the other hand, only occasionally had any favorable action on the heart in auricular fibrillation.

QUINIDINE has been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies.² It is obtained from cinchona bark as a by-product in the manufacture of quinine, to which it is closely related, being the stereo-isomer of quinine. Quinidine and other cinchona alkaloids are the only drugs known which have the specific effect of bringing about fibrillation of the auricles. This result has occurred in about 50 per cent of cases. Untoward symptoms brought about by its use in susceptible patients include nausea, vomiting, convulsions, palpitation, headache, faintness and flushing. The dosage quoted is as follows.

Quinidine is generally administered as quinidine sulphate. Commonly, 0.2 gm. (3 grains) of quinidine sulphate is given as a preliminary dose and is repeated after two hours to determine the patient's susceptibility to the drug. If there are no symptoms following this preliminary dose, therapeutic administration is begun on the following day when from 0.2 gm. to 0.4 gm. (3 to 6 grains) is given from three to five times daily for one to three days. As a rule, if the establishment of the normal rhythm can be effected the change occurs after from one to three days' treatment. The maximum dose per day advised by most authors is from 1 to 2 gm. (15 to 30 grains). If toxic symptoms occur the administration of the drug should be discontinued.

Jackson, Friedlander and Lawrence³ have attempted to solve the method of action of this drug without very definite success. They believe that it will be found to be a muscle depressant and that its action will be found to be exerted not only on the ventricle and auricles, but also on the musculature of the peripheral vessels, and, perhaps, even on the skeletal muscles.

Quinidine has been chiefly employed in cases of *auricular fibrillation*

¹ Journal of the American Medical Association, 1921, **77**, 1865.

² Ibid., 1922, **78**, 1051.

³ Journal of Laboratory and Clinical Medicine, 1922, **7**, 311.

because of its success in many instances in restoring this rhythm to normal. Oppenheimer and Mann¹ give, in tabular form, the summary of the published cases illustrating the effect of the drug on auricular fibrillation. The totals of their table, plus a few figures from recent articles, are as follows:

TABLE

Source.	Total cases reported.	Normal rhythm restored.	Rhythm changed to flutter.	Unaffected.
Cases collected by:				
Oppenheimer and Mann	171	87	13	71
Cases reported by:				
Oppenheimer and Mann ²	22	9	2	11
C. C. Wolferth ³	12	7	1	4
Hewlett and Sweeney ⁴	11	5	1	5
J. van Tilburg ⁵	10	8	..	2
Ellis and Clark-Kennedy ⁶ . . .	7	5	..	2
G. Floystrup ⁷	5	2	..	3
White, Marvin and Burwell ⁸ . .	33	24	..	9
Totals	271	147	17	107

These figures bear out the usual statement that the rhythm is restored to normal in about 50 per cent of the cases, but they do not give any evidence as to the permanence of the change nor the degree of clinical improvement which is associated. Wolferth states that the duration of normal rhythm following its restoration by quinidine for the most part has been merely temporary; many patients revert to fibrillation after a few days or weeks. In the experience of Bock,⁹ the effect is usually transient, but in some instances the action is prolonged, with no recurrence for from two months to a year. Frey¹⁰ obtained his best results in cases in which the fibrillation was of recent onset or of nervous origin.

The dangers of the drug in the treatment of auricular fibrillation are emphasized by Fyster and Fahr.¹¹ That the removal of an auricular fibrillation by the action of quinidine in producing normal rhythm is not without danger is illustrated by the first case they report. This is especially true in cases with valvular or severe myocardial disease and when true "cardiac failure" has been present. Their second case illustrates the strikingly favorable action of quinidine when auricular fibrillation is not complicated by advanced valvular or myocardial damage and where no serious break in compensation has occurred. However, Floystrup found that auricular fibrillation of over twenty years' standing was in 2 instance cured by quinidine.

¹ Journal of the American Medical Association, 1921, **57**, 1800.

² Loc. cit.

³ American Journal of the Medical Sciences, 1921, **162**, 812.

⁴ Journal of the American Medical Association, 1921, **77**, 1793.

⁵ Nederlandsch Tijdschrift v. Geneeskunde, 1921, **2**, 1555 (Abstract, Journal of the American Medical Association).

⁶ Lancet, 1921, **2**, 894.

⁷ Ugeskrift for Laeger., 1921, **83**, 1389 (Abstract, Journal of the American Medical Association).

⁸ Boston Medical and Surgical Journal, 1921, **185**, 647.

⁹ Medizinische Klinik, 1921, **47**, 1052.

¹⁰ Deutsches Archiv f. klinische Medizin, 1921, **136**, 70.

¹¹ Archives of Internal Medicine, 1922, **29**, 59.

Embolism after the cessation of fibrillation is an occasional happening and forms one of the risks of this therapy. Embolism occurred in 2 out of 5 cases in which normal rhythm was restored by Ellis and Clark-Kennedy. Several deaths have been attributed to quinidine therapy, but the exact relationship has not been clearly demonstrated. Clerc and Pezzi¹ believe the deaths were due to the severity of the myocardial disease and not to the effects of the drug.

Wilson and Hermann,² on the other hand, report a case in which cerebral embolism followed the arrest of auricular fibrillation by quinidine. Whether such embolism has been the cause of the other deaths which have been reported they do not know, but they suggest that cases for the employment of quinidine should be selected with great care.

A few instances are reported of the use of quinidine in other abnormalities of the cardiac rhythm and rate, but these cases are, for the most part, not convincing and further data will have to be accumulated.

Bock³ reports its use in 2 cases of heart block and auricular fibrillation without good resulting. Boden and Neukirch⁴ consider it more useful in paroxysmal tachycardia and extrasystolic arrhythmia than in auricular fibrillation. Cheinisse⁵ is quoted as saying that the drug is specially indicated in peripheral arteriosclerosis and hypertension. F. M. Smith⁶ treated 20 cases of extrasystole with quinidine, with improvement in 17. In 10, the irregularity was apparently eliminated. One of 2 cases of paroxysmal tachycardia treated was improved.

DISEASES OF THE BLOODVESSELS.

Diseases of the Aorta. ANEURYSM. A statistical study of aneurysm by Lucke and Rea⁷ gives us some interesting figures, some obtained by the authors in a review of some 12,000 autopsies performed in the Philadelphia General Hospital and in the Hospital of the University of Pennsylvania; other figures were obtained from the literature.

In 160,145 postmortem examinations, 1452 aneurysms were discovered, not including aneurysms of the peripheral arteries; that is, 1 in every 111, or 0.9 per cent, of patients examined post mortem. In the 12,000 autopsies reviewed by the authors, 321 "intracorporeal" aneurysms occurred in 268, or 2.2 per cent of the patients examined post mortem. The other conclusions which the authors arrived at are as follows:

Comparison of statistics shows that aneurysms are more frequent in the United States and Great Britain than in the Teutonic countries.

The aorta is more often involved; the various aortic branches are relatively rarely the seat of aneurysms.

¹ Paris médicale, 1921, **11**, 440.

² Journal of the American Medical Association, 1922, **78**, 865.

³ Medizinische Klinik, 1921, **17**, 1052.

⁴ Deutsches Archiv für klinische Medizin, 1921, **136**, 181.

⁵ Presse médicale, 1921, **29**, 748 (Abstract, Journal of the American Medical Association).

⁶ Journal of the American Medical Association, 1922, **78**, 877.

⁷ Ibid., 1921, **77**, 935.

The most frequent age period for aortic aneurysms is the fourth and fifth decades.

Aneurysm occurs at an earlier age in the negro than in the Caucasian race.

Aneurysm occurs about four times more frequently in males than in females.

Aneurysm is relatively more common in the negro than in the Caucasian.

In 53 patients (about 20 per cent) multiple aneurysms were found.

The clinical diagnosis was made in 43 per cent.

In contrast to the above figures, based on autopsy material, it is interesting to note a study made by F. A. Craig¹ of 5706 members of the police and fire departments of Philadelphia. These men were supposedly in good health and Craig points out the interest which developed during the process of examination at the frequency with which physical signs suggestive of aortic defects were discovered. In all, 49 cases were suspected of aortic changes, and of these one was proved to have a definite aneurysm. The other 48 cases were carefully studied in various ways; Roentgen-ray study was carried out in 33 instances, and, of these, 9 showed definite aortic changes; 8 slight changes; 3 were questionable, and 13 negative. Only 5 cases out of the 24 in which it was performed gave a positive Wassermann test, including the case of definite aneurysm. It would appear probable, therefore, as might perhaps be expected, that in such a body of men a number of instances of nonsyphilitic disease of the aorta would be discovered. Such nonsyphilitic disease of the aorta seldom results in aneurysm.

Dissecting aneurysms of the aorta are fairly infrequent according to Crowell,² who has reviewed the literature and found only 273 reported cases, to which number he adds 4 new cases. In 80 per cent the age was forty years or more, the entire range being from thirteen to ninety-five years. Crowell does not comment, in giving these figures, on a possible tendency of this type of aneurysm to occur at a later age than does the usual saccular form of aneurysm. Of the 4 cases he reports, one was fifty, one was sixty, one was sixty-one and one seventy-one years of age; these show a greater age than is usual for aneurysm. The vast majority of saccular aneurysms appear about the age of forty-five.

The probable explanation of the apparent later development of many dissecting aneurysms is that they result from arteriosclerosis more often than do saccular aneurysms, which more frequently have a syphilitic aortitis as their precursor. Of course, some dissecting aneurysms develop from the ordinary form and these may well have a syphilitic basis. Arteriosclerosis of the nonsyphilitic variety, on the other hand, seldom results in saccular aneurysm, according to the accepted views of the day.

In Crowell's youngest case the man, aged fifty years, there was found a syphilitic sclerosis of the aorta, and in the patient, aged sixty-one, the aorta is said to have shown both syphilis and senile sclerosis. T. C.

¹ American Journal of the Medical Sciences, 1922, **163**, 649.

² Journal of the American Medical Association, 1921, **77**, 2114.

Kelly¹ reports a dissecting aneurysm in a negro laborer forty-two years of age with a strongly positive Wassermann test. In this case, however, the dissecting nature of the aneurysm was an incident of an enormous saccular aneurysm of the descending arch.

The juvenile instances of dissecting aneurysm may be perhaps the result of degeneration of a hematoma in the walls of the aorta. Pincherle and Volta² report a most interesting case in a child, aged seven years. There was found a double parietal aneurysm consisting of two circumscribed swellings on the convexity of the aortic arch. The child also had chronic nephritis, fibrinous pericarditis, and parenchymatous myocarditis. The authors apparently are satisfied to attribute the lesions to syphilis, although no serological test was performed and no finding of spirochetes in the aorta is reported. It seems very improbable that syphilis was responsible.

Rupture of aortic aneurysm into the superior vena cava was referred to in this review two years ago, and comment was made on the characteristic appearance which patients with this condition present. The following illustration, which is taken from a case-report by Wien and Earle,³ gives an excellent picture of the appearance. The great size of the head and the fulness of the face, neck and chest were out of all proportion to that of the lower part of the body. The skin of the upper portion of the body, including the face and arms, was bluish red, and there was marked edema of the subcutaneous tissues. Both the edema and cyanosis were sharply marked off at the lower margin of the chest. The abdominal wall was thin and extending down over it were numerous markedly dilated veins, the blood flow in which was apparently downward to the groins. As usual in such instances of rupture into the vena cava the onset of the swelling and blueness had been sudden, but in this case it occurred during sleep and not, as in many cases, during physical exertion. The sudden onset as well as the degree of swelling and blueness help to differentiate this condition from simple pressure on the vena cava. Pulsation in the dilated external jugular, which was present in this case only on the right side, is also of diagnostic importance. The Wassermann test was strongly positive, a four-plus reaction being present.

At autopsy it was found that the aneurysm communicated with the superior vena cava through its posterior wall by an abnormal opening the result of the aneurysmal process.

In contrast, the case of obstruction of the superior vena cava by primary carcinoma of the lung reported by Dana and McIntosh⁴ is of interest. The patient was below the usual age for aneurysm, being twenty-nine years of age; the onset of the dyspnea and edema was gradual. Eventually, however, the picture approached quite closely to that of the patient reported above, but no pulsation was noted in the external jugular veins. The Wassermann was strongly positive, but at

¹ Medical Clinics of North America, 1921, **5**, 867.

² Riv. di clin. pediat., 1921, **19**, 577.

³ Journal of the American Medical Association, 1921, **76**, 1750.

⁴ American Journal of the Medical Sciences, 1922, **163**, 411.

autopsy, primary carcinoma of the lung, with extension into the superior vena cava and metastasis to the liver, was found.

Miscellaneous Notes on the Aorta and Aneurysms. G. T. Vaughan¹ reports the treatment of a saccular aneurysm of the abdominal aorta by partial ligation of the aorta below the aneurysm. The patient, a bricklayer by occupation, gave a history of syphilis. The aneurysm was about $1\frac{1}{2}$ inches in diameter and arose from the left side of the aorta behind the pancreas about opposite the origin of the superior mesenteric artery. At operation a piece of cotton tape $\frac{1}{2}$ inch wide was tied about the aorta about 2 inches above its bifurcation and just below the origin

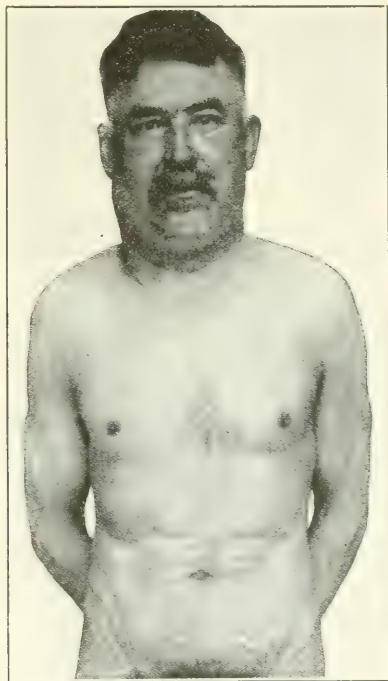


FIG. 3.—Appearance of patient, in whom were noted edema, disproportion between face, neck, chest and the rest of the body and the presence of varices on the abdominal wall.

of the inferior mesenteric artery. The ligature was drawn tighter until pulsation was no longer perceptible in the iliac arteries and barely so in the aorta below the ligature. Recovery from the operation was uneventful; the patient was kept in bed for two months and treated with potassium iodide. After four months he returned to his work and about thirteen months after the operation was working hard and looking well.

THROMBOSIS OF THE AORTA. Aubertin² by reporting 2 cases raises the recorded number to 34. The most characteristic symptom is a symmetrical gangrene of the legs; this was present in 18 of the 34 cases.

¹ *Annals of Surgery*, 1921, **74**, 308.

² *Annales de Médecine*, 1921, **10**, 454.

The gangrene may be limited in extent in rare instances but is more likely to be extensive; pain is usually present. Intermittent claudication in some cases and paraplegia in others may be present.

Herrmann and Burrows¹ report a very unusual case in which, during life, the picture was chiefly that of mediastinal pressure and myocardial failure. At autopsy a massive atheromatous tumor was found arising, it appeared, from an atypical branch of the aorta. Microscopically, the process seemed to have been inflammatory rather than neoplastic.

Peripheral Arteries. ANEURYSM. Richey and MacLachlan² state that over 100 well-authenticated instances of mycotic-embolic aneurysms of peripheral arteries are on record, the superior mesenteric artery being the vessel most frequently involved. By the term mycotic-embolic two factors are suggested, one the embolus and the other an infection. At times both may be supplied by an infective embolus, as in the case of bacterial endocarditis with embolism from the vegetations on the valves. But in other instances a peripheral artery aneurysm may arise from a noninfectious embolism or from infection reaching the vessel wall through the blood stream.

The authors report 2 cases, one with an aneurysm of the superior mesenteric, the other of the posterior tibial artery. In both cases these peripheral arterial lesions were associated with a definite vegetative endocarditis of the mitral or aortic valves, and in 1 case infarcts were found in the spleen and kidneys. No suggestion of syphilis was found in either case. Both aneurysms had ruptured at first slowly, with the formation of a false aneurysm. Clinically, the rupture of the aneurysms was characterized by severe, sudden, lancinating pain, which persisted.

Quite properly the authors remind us that mycotic-embolic aneurysms, though a very definite clinical entity, should be regarded only as an arterial manifestation of the disease—"subacute bacterial endocarditis." This is an important aspect of the case to keep in mind in reference to treatment. Radical surgical treatment of a peripheral aneurysm may be justifiable and successful if the aneurysm is not of the type associated with active endocarditis. But where active endocarditis is present there is little to be hoped from treatment, for the underlying cardiac condition remains unaltered. For the relief of pain, however, surgical measures may have to be taken. This point is not considered by the authors, who seem to consider surgical intervention always useless in the mycotic-embolic form of peripheral aneurysm.

Certainly, in traumatic aneurysm operation is indicated. A recent report by MacLaren³ shows its value in the case of an unusually large fusiform aneurysm of the femoral artery.

A very remarkable case of *multiple aneurysm in a child* is reported by Kennan.⁴ An anemic child, aged four years, developed four separate pulsating tumors, 2 near the thumb and 2 in the neck. These were apparently aneurysms. No endocarditis was present nor any other course of septic emboli; syphilis and injury could be excluded. Plasmodia, however, were found in the blood, but the relation of this infection to the peripheral arterial lesions was uncertain.

¹ Archives of Internal Medicine, 1922, **29**, 339.

² Ibid., 131.

³ Annals of Surgery, 1921, **74**, 306.

⁴ Annals of Tropical Medicine and Parasitology, 1921, **15**, 245.

Aneurysm of the hepatic artery falls in the group of those aneurysms more often due to other causes than to syphilis. Weiss¹ quotes the etiology in 26 cases in which the causative factor had been determined with some degree of certainty; in 15 cases it followed such an infection as pneumonia, osteomyelitis and typhoid fever; in 5 instances syphilis was apparently responsible; atheromatous arteritis in 2; cholelithiasis in 2; trauma in 1, and tuberculosis in 1. It is interesting to note that bacterial endocarditis does not appear once in this list. In the case reported by Weiss the etiology was thought to be syphilis.

In some cases no symptoms occur and the aneurysm is not suspected until it ruptures. In most cases, however, symptoms referable to the liver are present. Pain, jaundice, and hemorrhage (hematemesis or melena) are the prominent features in many cases. In typical cases the pain is said to be paroxysmal and of great severity, resembling that of biliary colic. Jaundice may be due to pressure on the ducts or to obstruction by bile in the ducts. Fever has been present in a few cases. Rarely are tumor or bruit present, and then only in the terminal stages. Weiss concludes that under favorable circumstances the treatment is ligation of the hepatic artery.

Pedersen² in discussing 3 cases of intracranial aneurysm is inclined to incriminate influenza as the causal factor.

Others have also described changes in arterial walls after influenza, especially in the smaller vessels of the brain and its covering membranes.

Harbitz,³ of Norway, in the examination of microscopic preparations from a large amount of anatomical material, came across occasional peculiar lesions in the vessels that do not correspond to the usual forms of arteritis as seen in syphilitic arteritis or periarteritis nodosa. In one instance the patient had had "idiopathic" renal hemorrhage, in another purpura rheumatica; in 3 cases the cerebral vessels were involved, in 1 the coronaries. Apparently, he believes that the arteritis is of infectious etiology and merely differs in the exact nature of the resulting lesions.

Harbitz then gives the summary of a typical case of *Periarteritis Nodosa*. A man, aged twenty-two years, began to suffer with stabbing pains in the left foot. Later, he noticed that the foot was tender and felt dead; he stumbled easily. A month later the other foot became involved and both rapidly became worse. The gait became paretic. Six months later palpitation of the heart and dyspnea appeared; fever, tenderness in the epigastrium with vomiting and slight icterus were present. Edema and then ascites, developed and death occurred about eight months from the onset.

At autopsy, the coronary arteries were very prominent and showed here and there oval, grayish-white nodules up to the size of a hemp seed. Also on the arteries in the stomach wall similar nodules were found; and similar lesions were present on the arteries of the omentum. Microscopically, it was found that the smaller arteries in the heart, kidneys, stomach, intestines, omentum and in certain muscles and nerves were the seat of a productive inflammatory process.

¹ American Journal of the Medical Sciences, 1921, **161**, 859.

² Hospitalstidende, 1921, **64**, 721 (Abstract, Journal of the American Medical Association).

³ American Journal of the Medical Sciences, 1922, **163**, 250.

The clinical picture of periarteritis nodosa depends almost entirely upon the location of the arterial lesions. The most common type, Harbitz states, is the muscle-nerve form to which the case he reports belongs. In other instances the symptoms may be renal, gastro-intestinal or cardiac; the brain is seldom involved. The disease usually attacks previously healthy young adults. Death is the usual result, but cases have been known to recover. The primary anatomical changes are in the small and medium-sized arteries in the heart, kidneys, digestive tract, etc.; the larger arteries, as a rule, are not involved. The lumen is usually narrowed, but true aneurysms have been observed. Grossly, the lesions are very characteristic—oval, grayish white, usually firm aneurysm-like nodules in linear arrangement on the small arteries.

CORONARY SCLEROSIS AND ANGINA PECTORIS. All cases of true angina pectoris are not due to sclerosis of the coronary arteries, although in many instances this is an important factor. Other causes include valvular disease of the heart or atheroma of the aorta. For example, Gallavardin¹ has reported 10 cases of what appeared to be typical angina pectoris in which endocardial disease seemed to be responsible for the anginal pains. Schmidt² believes that atheroma of the aorta is a more constant finding in angina pectoris than are changes in the coronary arteries. The aortic changes are most often syphilitic or gouty. The heart itself in many cases may not be diseased. Robey³ emphasizes this point—that true angina pectoris may exist without any cardiac signs whatever. If the attacks of pain about the heart have the characteristics of true angina pectoris they should never be disregarded in middle-aged or old people even though there may be no history or evidence of cardiac disease. In young people, without the history or evidence of cardiac disease, we are often justified in disregarding pain about the heart.

Blood-pressure. DURING SLEEP few studies of blood-pressure have been made and the influence of sleep, with its reduction of psychic factors, is almost unknown. Blankenhorn⁴ has described a method by which estimations of both systolic and diastolic pressure may be made without, as a rule, disturbing the sleeping individual. He states that studies with this apparatus will be reported later. In the meantime, however, C. Müller⁵ has reported some very interesting findings, both in normal individuals of various ages and in a group of patients with high blood-pressure.

Müller finds that during sleep the normal individual shows a distinct reduction in systolic pressure, and this is independent of the psychic influences which so often result in a reading above normal when the patient is awake. The same principle he found applies to pressures definitely above normal during the waking hours. In such a case it is impossible, merely on the basis of the blood-pressure alone, to ascertain whether this hypertension is due to psychic or to true pathologic factors unless the pressure during sleep is also recorded. If the pressure is found to be high during quiet sleep one can feel sure that the hyper-

¹ Presse médicale, 1922, **30**, 77.

² Medizinische Klinik, 1922, **18**, 6.

³ Medical Clinics of North America, 1922, **5**, 1191.

⁴ Journal of the American Medical Association, 1921, **77**, 90.

⁵ Acta Medica Scandinavica, Fasc. IV and V, vol. **55**.

tension is an evidence of true disease, but if found low during sleep then one can assume that the high pressure of the waking hours is to be attributed to neurogenic influences. Müller describes the findings in the different stages of hypertension and in the various forms of nephritis; in all, however, the same principle applies.

UNILATERAL ALTERATIONS IN BLOOD-PRESSURE were mentioned in this review two years ago and the remarkable claims of Cyriax were commented on. This investigator¹ has continued his studies and finds no reason to change his former conclusions that the pressure should always be read in both arms, as there is frequently a variation between the two, and no true estimate of the state of the circulation can be obtained from a single reading. To the reviewer it would seem that the matter was of less importance than the author apparently believes.

BLOOD VISCOSITY and its relation to blood-pressure is discussed in the same journal by Lyon,² who believes that blood viscosity is an important factor in maintaining blood-pressure, but that changes in the viscosity of the blood are so easily and rapidly compensated for by the body that, as a practical matter, the changes in viscosity probably play little part in determining the pressure. This coincides with the facts, for few observers have found very constant relation between the viscosity and the pressure.

In the aged, however, as Holmes³ has pointed out, viscosity may be a factor in the production of hemiplegia, and for this reason the prevention of dehydration in the aged, and especially in those with vascular disease, is important.

ALTERED BLOOD-PRESSURE AND ITS RELATION TO NERVOUS IMBALANCE is discussed by McCarthy.⁴ He takes for his text that it makes not so much difference what disease the patient has as what patient the disease has. He discusses the part played by both hypo- and hypertension in the various functional disorders of the nervous system and he emphasizes the importance of rest in their treatment.

BLOOD-PRESSURE IN DIABETES. Kylin⁵ has found that the majority of cases of diabetes mellitus exhibit an unstable type of high blood-pressure. This variety of hypertension shows great variation during the day and no corresponding increase in capillary pressure. Kylin attempts to differentiate it from the hypertension associated, for example, with glomerulonephritis, in which form the capillary pressure is increased. In diabetes the increased but unstable pressure is associated with an instability of the vasomotor mechanism in general, and Kylin believes that there is a syndrome composed of this type of hypertension, unstable vasomotor control, lymphocytosis and low tolerance for carbohydrates. He even suggests that this syndrome and the diabetes itself have a common cause.

Rosenbloom,⁷ on the contrary, has found, in a study of 142 cases of

¹ Quarterly Journal of Medicine, 1921, **14**, 309.

² Ibid., 1921, **14**, 398.

³ Journal of the American Medical Association, 1921, **76**, 1640.

⁴ Pennsylvania State Medical Journal, 1921, **24**, 806.

⁵ Zentralblatt für innere Medizin, 1921, **42**, 873.

⁶ Hygiea, 1922, **84**, 49.

⁷ Journal of Laboratory and Clinical Medicine, 1922, **7**, 392.

diabetes mellitus, that the blood-pressure in uncomplicated cases was normal or slightly below normal. In every case in which hypertension was present he was able to demonstrate an associated nephritis, arteriosclerosis or aortitis.

BLOOD-PRESSURE AND PULSE-RATE would seem to bear a relation to one another, but the reported studies show a wide variability. Addis¹ studied a large series of healthy soldiers and patients with so-called "irritable heart" and others with hypertension. Records were made, both in the early morning before the subjects had risen from bed or taken food and also during the day at any time except after muscular exertion. It would appear that the same factors enter into this study as were mentioned above in reference to the blood-pressure during sleep.

Mannaberg² found that 55 per cent of 241 patients with hypertension had a normal pulse-rate; 43 per cent had a pulse-rate above normal and only 3 per cent below normal. These figures contradict the older view that bradycardia is the rule with hypertension.

LOW SALT DIET in the treatment of hypertension is still receiving considerable attention but nothing new has been reported. Some report brilliant success with this method of reducing high blood-pressure, others are less enthusiastic. It is probably a question of the selection of suitable cases for this type of treatment; there is no reason to believe that every case will respond.

Houghton³ is very enthusiastic concerning the efficacy of the low salt diet. He even states that if the hypertension does not quite promptly become normal under this regimen, either the patient's diet is not below 2 grams of sodium chloride per day or there is present advanced nephritis which delays the elimination of the accumulated salt in the body. In this group of cases more time is required to accomplish the desired results.

On the other hand, McLester⁴ has studied a series of cases on a very carefully controlled almost salt-free diet and comes to the conclusion that the almost complete elimination of chlorides from the diet of patients with nephritis and vascular hypertension accomplishes little, if anything, more than does the salt-poor diet ordinarily prescribed. He summarizes his results as follows:

1. The patient found the food unappetizing and usually ate little. This factor cannot be disregarded.
2. The blood urea, instead of decreasing, showed a tendency to increase.
3. The blood chlorides, irrespective of diet, varied but little, while the urine chlorides, reflecting the degree of the patient's adherence to the diet, fell to a very low figure.
4. The systolic pressure, as a rule, showed a moderate fall. This fall was never marked.
5. In two of the patients there developed weakness and prostration to a distressing degree.
6. One of the patients suddenly experienced retinal hemorrhages and other fundus changes at the end of two weeks of this diet.

¹ Archives of Internal Medicine, 1922, **29**, 539.

² Wiener klinische Wchnschr., 1922, **35**, 145.

³ Medical Record, 1922, **101**, 441.

⁴ American Journal of the Medical Sciences, 1922, **163**, 794.

DISEASES OF THE BRONCHI, PLEURA AND LUNGS.

By H. R. M. LANDIS, M.D.

THE BRONCHI.

Primary Carcinoma of the Trachea. Primary involvement of the trachea or bronchi with malignant growths is not common. Cayce¹ reports the case of a man, aged sixty-four years, whose illness first manifested itself with shortness of breath on exertion. He also had a cough and intermittent attacks which resembled asthma. The breathing gradually became more difficult, the dyspnea being both inspiratory and expiratory. The skin was slightly discolored toward the end of his illness. A roentgenogram showed a shadow at the bifurcation of the trachea which was interpreted as a cavity.

At the autopsy, a tumor was found at the bifurcation of the trachea, with a large sessile base located on the posterior wall of the trachea and left bronchus. The tumor had extended downward into the lumen of the left bronchus, completely occluding it. It also impinged on the lumen of the right bronchus but did not occlude it.

There was no metastasis. The tumor proved to be an adenocarcinoma.

I have recently encountered a case of this nature. The outstanding feature was dyspnea, both inspiratory and expiratory. The nature of the dyspnea remained unexplained until a bronchoscopic examination revealed a malignant growth near the bifurcation of the trachea. This was removed through the bronchoscope by Chevalier Jackson and radium treatment instituted. The woman is wonderfully improved, but a fatal outcome is eventually to be expected.

Musculature of the Bronchi. Miller,² who has contributed many interesting studies on the anatomy and histology of the lungs, finds that the bronchial musculature is not arranged in the form of distinct bands which encircle the bronchi and bronchioli, neither is it in the form of a continuous sheet, but it is in the form of a network. This network is made up of geodesic bands which prevent any tangential motion, and in this way provide for the greatest amount of strength and at the same time permit the greatest amount of extension and contraction of the bronchioli and their subsequent subdivisions.

The muscle bands form a sphincter about the openings of the alveoli into the bronchioli respiratorii and ductuli alveolares; they also form a sphincter about the openings leading into the atria. These bands belong to the musculature of the bronchial tree and not to the air spaces.

¹ Southern Medical Journal, May, 1921.

² American Review of Tuberculosis, November, 1921.

Distal to the openings leading into the atria no muscle has been found. There is no muscle in the walls of the air spaces.

The size and position of the lungs is constantly changing with the respiratory movements. If the condition of the lungs at the end of a normal expiration be taken as a starting point, it will be found that in the act of inspiration they increase in extent, especially that portion of each lung that is directly influenced by the descent of the diaphragm. This increase in size has its influence on the bronchial tree and especially on the smaller bronchi, the bronchioli, and their subdivision.

In extreme expiration the dorsal and lateral branches form an acute angle with the main stem bronchus, while in inspiration they open out, the angle becomes wider and at the same time they elongate. This change is necessary in order that provision may be made for the expansion of the air spaces.

The action of the bronchial musculature in expiration is active rather than passive.

"Common Colds." The usual hypothesis advanced to explain colds has been that the various types of bacteria normally contained in the nasopharynx are stimulated into activity by some unusual circumstance which lowers the local resistance. The ordinary simple cold, characterized by hyperemia of the mucous membrane of the upper air passages, should be distinguished from those associated with sinus infections, middle ear involvement, laryngitis, etc. These are due, for the most part, to pyogenic infections.¹ Bloomfield concludes that the common cold is not caused by the ordinary bacteria found in the nose and throat. In complicated cases the bacterial flora differs in no fundamental way from that found in healthy persons, although it is distinctly richer and more varied. This, he believes, fits in with the old hypothesis that the cold, whether produced primarily by temperature change or by infection, leads to environmental alterations which, as it were, light up the bacterial flora already present in the pharynx. He believes that the presence of these organisms is too variable and inconstant to warrant the conclusion that they are the primary causes of colds.

Bloomfield leans to the belief that a filtrable virus is the cause of colds.

So far as our observations go, "colds" appear to be distinctly infectious, whatever the primary cause may be. Tuberculosis sanatoria have recognized this fact for years and, so far as possible, shield the patient from contact with those suffering from acute colds.

Bronchial Spirochetosis. Although the reported number of instances of this affection is not great in this country, there is reason to believe that spirochetal infection of the respiratory tract is far more common than is ordinarily thought. Just as in the case of other less common pulmonary infections, it is overlooked because the possibility of its existence is not thought of.

Bronchial spirochetosis was first described by Castellani, in 1906. His first cases were observed in the island of Ceylon and for some years the infection was thought to be limited to tropical countries. Its first

¹ Editorial, Journal of the American Medical Association, July 16, 1921.

appearance in the temperate zone was noted by Belgian medical officers during the World War. The supposition was that it was imported by native Asiatic troops who, in turn, infected the Europeans. This may, or may not, have been the case, as many of the cases reported in this country have lived here for years and, so far as known, were not exposed to the disease. I think that most are agreed that the condition is far more common than thought, and, if more consistently looked for in every suspicious case, more instances would be noted.

Faille¹ describes the disease as usually commencing as an acute bronchitis with blood-streaked sputum. In a few days the acute symptoms pass off and the patient may make a comfortable recovery. More often, however, a chronic bronchitis ensues, with loss of weight, emaciation and chronic cough. The sputum is abundant, frothy, and varying in color from faint pink to bright red. The hemoptyses may continue for weeks and then cease for weeks. Among the cases reported in this country the sputum in some was jelly-like and blood-tinged, in some hemorrhagic, and in others purulent and foul smelling.

Castellani distinguished three types of the disease—acute, subacute and chronic. In the acute type fever up to 103° F. is common; the subacute type may last several weeks, with slight fever; the chronic form may follow an acute or subacute attack. There may be an irregular type of fever but frequently the patient is afebrile.

In the acute stage, the sputum contains large numbers of spirochetes, while in the chronic stage, repeated examinations may be needed to find them. The spirochetes are large and polymorphous, with from two to nine spirals. As Faille points out, a diagnosis of tuberculosis is usually made, and he urges that in cases of hemorrhagic sputum when tubercle bacilli are absent, search should be made for the spirochete. He quotes Farah² who, in 22 cases of hemoptysis examined at Beirut, 12 had tubercle bacilli and 6 spirochetes. Faille states that in his experience the spirochete showed up well when stained with Congo-red; carbol-gentian is also recommended as a stain. The Fontana stain is the one usually recommended.

Castellani states that the diagnosis may be based on the microscopic examination of the sputum collected after cleansing the mouth and throat. The sputum may be examined fresh or by means of one of the aniline stains.

Bloedorn and Houghton,³ in reporting 3 cases, conclude that:

1. Bronchial spirochetosis exists in the United States and is probably more widespread than is generally recognized.
2. The disease, in its clinical aspects, is very suggestive of pulmonary tuberculosis, but usually can be readily distinguished from this infection.
3. The routine examination of all sputum should include a search for spirochetes, and their presence should be regarded as significant, unless proved otherwise.
4. The disease appears to be capable of transmission from an infected

¹ Tubercle, June, 1921.

² Lancet, October, 1919.

³ Journal of the American Medical Association, June 4, 1921.

to a non-infected individual, although the degree of contagiousness is probably slight.

5. An individual harboring the spirochetes in the sputum may present little or no evidence of the disease himself, and it appears that there exist carriers of *Spirochæta bronchialis*.

6. The disease, as a rule, responds readily to treatment, and the arsenical preparations, particularly arsphenamine, are very efficacious.

Segara and Puccio¹ report cultivating Castellani's spirochete from the sputum of a previously healthy man, aged thirty-three years. The trouble developed suddenly, with pain, cough and sputum of a dirty-red color. There was no fever. The infection lasted about two months. The patient was an Arab who had lived in Argentina for fifteen years. He recovered under the use of arsphenamine.

In addition to producing a type of bronchitis which closely resembles the manifestations of pulmonary tuberculosis, cases of *pulmonary gangrene*, the result of spirochetal infection are being reported. In a series of 130 autopsies since May, 1919, B. S. Kline² noted gangrenous ulceration of the bronchial branches and lung in 3. All these cases had dental caries and gingivitis, the exudate from which was yellow or green, of foul odor, and microscopically showed large numbers of fusiform bacilli and spirochetes varying considerably in morphology. Kline states that these spirochetes resemble *Spirochæta buccalis*, *Vincenti*, *microdentium*, *mocusum* and *macrodentium*.

Pathologically, the lesions are similar in appearance to numerous small areas of gelatinous and early tuberculous pneumonia. At a farther stage there is beginning gangrenous ulceration of smaller bronchial branches and consolidated lung. The gangrenous tissue is greenish-yellow and dark green, and has a penetratingly, foul odor. Still older lesions consist of cavities encapsulated by firm, gray-white tissue and firmly consolidated lung.

Kline concludes that these three cases warrant the assertion that:

1. The presence in large numbers of fusiform bacilli and spirochete in early gangrenous ulceration of the lung suggests their etiological relationship thereto.

2. In all three cases, marked dental caries and pyorrhea alveolaris were present. Smears from these lesions showed spirochetes of varying morphology.

3. These organisms, which are poorly colored by the usual laboratory stains, are readily demonstrated by the Fontana method in smears and by the Levaditi method in tissues.

4. From a study of the pulmonary lesions in these three cases, the impression is gained that they are extensive pneumonias, caused by organisms from the unclean mouth, in which gangrenous ulceration occurs because of activity of the aspirated fusiform bacilli and spirochetes.

5. If the foregoing explanation is correct, this type of spirochetal pulmonary gangrene may be prevented by proper oral hygienic measures.

¹ *Semana médica*, September 8, 1921.

² *Journal of the American Medical Association*, December 10, 1921.

Fibrinous Bronchitis. So far as reported instances in the literature are concerned, this is a relatively rare condition. Weber¹ reports a case which developed in a woman, aged forty years, coincidently with an exophthalmic goiter, after an attack of influenza. As the goiter improved, the fibrinous bronchitis subsided. Weber regards this as an instance of endocrine disturbance rather than a coincidence. He quotes two cases, reported by Curschmann, of asthma associated with exophthalmic goiter as being of the same type of endocrine disturbance.

This may be the explanation of fibrinous bronchitis. Of the cases so far recorded, the apparent etiology has been obscure. Some have believed that it was frequently associated with pulmonary tuberculosis, but there is little to bear this out.

Fibrinous bronchitis usually manifests itself as an ordinary simple bronchitis. Unless the fibrinous casts of the bronchi are found, a diagnosis is not possible. These casts are frequently expelled in the form of small pellets. The only case I have observed was of this nature—the patient making the discovery himself. Another feature which should arouse suspicion is the involvement of only a portion of the bronchial tree, usually in one of the lower lobes.

Foreign Body in the Bronchi. The extraordinary achievements and the numerous contributions of Chevalier Jackson have brought the attention of the profession to this accident very forcibly within the past few years. Although the occurrence of a foreign body in the air passages is not very common, at the same time it is encountered with sufficient frequency to make us alert to the possibility of such an accident in certain types of respiratory trouble.

Certain general principles are to be borne in mind: (1) About 80 per cent of foreign bodies are encountered in children under ten years of age; (2) in about 80 per cent of all cases, children and adults, the foreign body is on the right side; (3) bearing this in mind one should always suspect the presence of a foreign body in cases in which the physical signs are limited to the bases of the lungs, especially the right side; (4) it must be remembered foreign bodies pass into the bronchi, at times, with relatively little disturbance and the patient has no recollection of such an occurrence, or has forgotten the trivial symptoms which followed. This, of course, is almost the rule in the case of small children.

It is safe to say that in those cases in which the entrance of the foreign body has escaped attention, that tuberculosis is assigned as the cause of the trouble. This is to be ascribed to the cough, expectoration, blood-tinged sputum, loss of weight, fever and abnormal physical signs. It is a good working rule to remember that any lesion below the midline of the chest is rarely, if ever, tuberculosis; if in the upper lobes it may, or may not, be tuberculous, with the probabilities all being in favor of the former assumption. Physical signs caused by a foreign body are located at the bases of the lungs.

There is nothing distinctive in the physical signs. A variety of conditions may produce essentially the same findings. A foreign body

¹ Medizinische Klinik, September 18, 1921.

is a possibility always, and such cases should be examined by the roentgen ray.

In a recent article on the *prognosis of foreign bodies in the air passages*, Chevalier Jackson¹ draws the following conclusions:

1. The prognosis of unremoved foreign body in the lung is grave.
2. About 2 per cent of foreign bodies are coughed up, and in these cases the prognosis is good; but this fortunate termination is too rare to justify waiting, in view of the fact that bronchoscopy is 98 per cent successful. As between thoracotomy and waiting for spontaneous expulsion that may never happen, the prognosis of the latter course is less serious.
3. The prognosis of thoracotomy for removal of aspirated foreign bodies, so far as can be determined, is extremely grave. For penetrating foreign bodies, it is so grave as to be inadvisable unless suppuration has intervened.
4. The prognosis as to bronchoscopic removal of aspirated foreign bodies is very good (98 per cent removals). It may be said that almost any localizable foreign body that has gone down the natural passages can be brought up the same way. The prognosis as to recovery after removal is excellent (98.3 per cent recoveries). Of 44 cases complicated by abscess or bronchiectasis, in 42 (94.4 per cent) the patients recovered good health. The risks of a very brief and careful bronchoscopy without general anesthesia are almost *nil*.
5. The prognosis in case of a penetrating foreign body removed from the lung by bronchoscopy through the mouth, based on the only case so far thus dealt with, is good. The patient had no hemorrhage, no rise of temperature, was discharged cured three days after the bronchoscopy, and is still in perfect health. A large series of cases will be required to determine the prognosis. The method is necessarily limited to foreign bodies whose smallest diameter is less than that of the main bronchus of the invaded lung. It can be considered justifiable only after careful localization studies by lung-mapping in the particular case; otherwise fatal hemorrhage may be encountered.

Castillo² reports the successful removal of a seed from the bronchus of a child. Seeds and other foreign bodies which are permeable to the roentgen rays offer the greatest difficulty for two reasons: (1) Absolute knowledge of the presence of the foreign body cannot be obtained by the roentgen rays as in the case of metallic objects; (2) localization is difficult for the same reason.

Jackson has described a sign which is of service in cases of a suspected foreign body, and particularly those in which the body is permeable to the roentgen rays. He designates this sign the "asthmatoïd wheeze." It is elicited by auscultation, the ear of the examiner being placed close to the open mouth of the patient. It resembles the wheezing of the asthmatic patient, but is drier. It is best elicited during forced and prolonged expiration or following coughing. In many cases it is readily detected during mirror laryngoscopy in older children and adults.

¹ Journal of the American Medical Association, October 8, 1921.

² Brazil-medico, August 21, 1921.

In certain cases the seed may move with the ingress and egress of the air and in this way produce a clicking sound. It is well to remember that the watermelon seed has been the offender in a number of instances. Patients presenting obscure respiratory signs and symptoms during the season of this fruit should be examined with this possibility in mind.

Weiss and Krusen¹ report a case in which the foreign body had been present for thirty-eight years. In this case extensive chronic inflammatory change had taken place in the right lung.

Bronchoscopy was performed and an abscess cavity was entered. A large amount of foul pus was evacuated. The poor condition of the patient precluded further attempts to locate the foreign body. The patient died four days later from a severe pulmonary hemorrhage.

At the autopsy, a small, metallic body, apparently the head of a scarf pin, was found. The lower lobe of the right lung was atelectatic and practically all involved in a large multilocular abscess, with considerable formation of fibrous tissue.

Histological examination of the diseased tissue showed marked increase of fibrous tissue, pronounced small, round-cell infiltration and, in addition, invasion by a tumor process. The bronchial walls were very thick and infiltrated by small round cells, and, in addition, the epithelium lining some of the bronchi had reverted to the squamous type. The tumor proper was composed of irregular strands and islands of atypical epithelial cells, with a substantial stroma of fibrous tissue. The cells were large, round or oval, and often were in whorled arrangement with what appeared to be typically keratinized centers. The growth had all the appearance of squamous-cell carcinoma and, as such, probably arose from bronchial mucosa or alveolar epithelium.

Weiss and Krusen believe that the presence of a foreign body for such a long period of time, producing marked chronic inflammatory change both in the lung and the bronchi, with distinct metaplasia of the bronchial epithelium, would seem to point to the latter as the source of this unusual *primary cancer of the lung*.

Broncho-esophageal Fistula. Two examples of this condition are reported by Hawes.² One case followed an acute pulmonary infection and healed spontaneously. The lung seemed to suffer no ill-effects from the passage through it of barium or food—liquid or solid.

In the second case a diagnosis of tuberculosis had been made in 1916, and again in 1919, because of abnormal physical signs in the lung and hemorrhages. Roentgen-ray examination demonstrated a sinus communicating between the process in the lung and the esophagus. This patient had been isolated from her children because of the fear of her infecting them with tuberculosis.

Bronchobiliary Fistula. An unusual instance of this condition is reported by Burgess.³ The case was that of a woman who apparently in good health and without any previous illness of note, suddenly commenced, without any obvious cause, to cough up bile. She con-

¹ Journal of the American Medical Association, February 18, 1922.

² American Journal of the Medical Sciences, June, 1921.

³ British Journal of Surgery, October, 1921.

tinued to do this for five months, the expectorated material amounting to from 10 to 20 ounces daily. As the patient was becoming exhausted, a laparotomy was performed. The operative findings led Burgess to conclude that the following sequence of events had occurred: Gallstones in the gall-bladder and common duct; suppurative cholangitis and perforation of the left hepatic duct; formation of a small subphrenic abscess between the extremity of the left lobe of the liver, diaphragm, spleen and lesser curvature of the stomach; adhesion of the left lung to the upper surface of the diaphragm; gradual inspissation of the contents of the abscess, with thickening and calcification of its walls; extension of the lumen upward through the diaphragm into the left lung, and, finally, rupture into one of the smaller bronchi with the development of a bronchobiliary fistula.

THE PLEURA.

Pleurisy. In a study of a series of cases of pleurisy in children, Nobel¹ concludes that almost all cases, with the exception of those in which a different etiology can be clearly demonstrated, are of tuberculous origin. Of 78 children treated for pleurisy, 13 died, while 26 could not, for various reasons, be reexamined after leaving the hospital. Thirty-nine were reexamined at intervals ranging from a few months to nineteen years, and the results compared with the original findings. Of the 39 reexamined, 43.6 per cent had completely recovered, 36 per cent gave only slight evidence of having had trouble; in 10 per cent, there were moderate changes and in 10 per cent more there were grave changes that were plainly traceable to the pleural affection. He believes, therefore, that the prognosis of tuberculous pleuritis in children is favorable and that extension of the disease is not apt to occur.

Landgraf² reports an example of localized tuberculosis in the pleura. A man, aged thirty years, died after six months illness. At autopsy, the pleura was studded with cheesy foci, while the lungs were intact, and the only lymph nodes involved were the substernal.

In another case with tuberculosis of the lungs and a tuberculous empyema, areas of ossification were found in the pleura.

Apical Pleuritis and its Relation to Pulmonary Tuberculosis. In estimating the frequency of the presence of tuberculosis as found at autopsy, the only evidence in many instances has been an apical pleurisy. Many regard this condition as being tuberculous, although it is not always easy to demonstrate the tuberculous nature of the lesion histologically; others deny that these pleurisies are tuberculous.

In a statistical study of stereoscopic roentgenograms of 366 consecutive adult chests, Van Zwahnvenburg and Grabfield³ conclude that pleural shadows over the apices in various forms occur with great frequency and that by insensible graduations these shadows pass into those of frank pulmonary tuberculosis. The demonstrated association

¹ Wiener klinische Wochenschrift, September 1, 1921.

² Zeitschrift für Tuberculose, August, 1921.

³ American Review of Tuberculosis, June, 1921.

with pulmonary tuberculosis demonstrates a prevailing tuberculous nature. Chronologically, the apical pleuritis precedes the pulmonary involvement.

The prevailing tendency to spread is (a) to the opposite apex and (b) to the underlying lung. They believe the infection probably reaches the pleura through the cervical lymphatics.

Pleurisy complicating typhoid fever was noted in 5 cases by Dumas and Paupert-Ravault.¹ One they ascribe to the typhoid bacillus; 2 were secondary to a bronchopneumonia; and 2 they believed to be rheumatic in origin. Their reasons for assuming a rheumatic basis for 2 of the cases were the leukocyte count and the associated sign and symptoms referable to the heart and pericardium.

Tuberculous Empyema. McKinnie² has sounded a timely warning in regard to the treatment of tuberculous empyema. Assuming a purulent effusion exists and not definitely metapneumonic or post-influenzal, McKinnie urges that the greatest care should be taken to exclude tuberculosis before instituting open drainage, since cases of empyema showing no tubercle bacilli almost universally heal promptly, while those having tubercle bacilli rarely do so. Inasmuch as the case is rarely urgent, careful and repeated search for tubercle bacilli in the pleural fluid and also in the sputum should be made. The lungs should be carefully examined and the history carefully considered with a view of proving or disproving the presence of tuberculosis. It is also well to remember that a pint or more of pus in the pleural cavity is no great menace to the tuberculous patient. To attempt to treat such a condition surgically is usually disastrous. Not because of any immediate bad effects but because it almost certainly condemns the patient to an open discharging fistula which only too often irritates and excoriates the skin about the opening.

McKinnie has, within the past few years, observed 28 cases of tuberculous empyema with mixed infections. Eight of these were treated by aspiration and 20 by open drainage. All of the aspirative cases were treated by McKinnie, the drainage cases were not seen by him until varying periods of time after the operation.

Of the cases treated by open drainage, 9 are dead, only 1 being considered as at all well. All the rest must be considered as more or less chronic invalids. Of the 8 patients treated by aspiration, 1 is dead; all the others are working and in good health. McKinnie feels that his experience emphasizes the following points:

1. Open drainage in tuberculous empyema is an unsatisfactory and often a disastrous procedure when the end-results are considered.

2. The presence of other organisms in the pleural pus besides the tubercle bacillus—mixed infections—can be successfully treated by aspiration and replacement by air, which is contrary to the usual teaching.

3. The tuberculous base of empyema is often overlooked.

¹ Lyon medical, April 25, 1922.

² Journal of the American Medical Association, February 11, 1922.

Chylothorax. Examples of true chylothorax are not common. There are only some 54 cases on record. The condition is usually unilateral. Trauma is the most common cause. Watts¹ reports the case of an insane patient who shoved a knife into the suprasternal notch as far as he could, moving it crosswise and up and down. The thoracic duct was cut across, and chyle escaped into both pleural cavities.

The condition was not recognized until after the patient's death, when a thorough dissection of the neck region was made.

Mesothelioma of the Pleura. Primary malignant disease of the pleura is not common. It is possible, however, that the disease is not recognized in some instances and is mistaken for a chronic inflammatory thickening of the pleura. Wood and Walter² report the case of a man, aged forty-five years, who sustained a crushing injury of the left side of the chest when he was twenty-two years of age. A year ago he first complained of pain in the lower left chest which was diagnosed as acute pleurisy and was relieved at once by strapping. Thirty days later he returned complaining of shortness of breath, cough and pain in the left chest. Physical examination showed signs of an effusion extending up to the level of the fourth rib and this was verified by fluoroscopic examination. He was aspirated, and three and one-half quarts of pale, straw-colored fluid removed. Seven days later this reaccumulated. He was aspirated eight times. The fluid contained many small mononuclear leukocytes. At no time was the fluid in the least hemorrhagic in character. The man finally died of cardiac failure. At the autopsy, a firm, whitish growth involved the pleura. Careful search failed to reveal malignancy elsewhere in the body.

Another example of a primary malignant growth of the pleura is reported by Eastwood and Martin.³ This patient was a man, aged thirty-eight years, who first complained of a slight cough and some shortness of breath. The dyspnea gradually increased until he was unable to go about and was compelled to sit in a chair all day. A little later he developed some tenderness over the upper part of the sternum. There was a prominence on the chest just below the angle of the sternum and to the left at the junction of the third costal cartilage with the sternum. This was extremely tender. Physical examination also showed the signs of a large effusion in the right pleural cavity. The chest was tapped a number of times with the removal first of pale, straw-colored fluid, and, later, hemorrhagic fluid. The patient died suddenly eleven weeks later from the manifestation of the first symptoms.

At autopsy, a malignant growth was found which took the form of massive nodular thickening of the parietal pleura lining the whole of the ribs, costal cartilages, sternum and diaphragm on the right side. In addition, the root of the right lung was slightly infiltrated with the growth. The right lung was completely collapsed. The mediastinal lymph nodes were enlarged and densely infiltrated with the growth.

¹ *Annals of Surgery*, December, 1921.

² *Missouri State Medical Association Journal*, August, 1921.

³ *Lancet*, July 25, 1921.

THE LUNGS.

Extra Pulmonary Causes of Respiratory Signs and Symptoms. Clendening¹ calls attention to the fact that symptoms and physical signs indicating affections of the lung may be caused by other conditions. Thus cough may be due to ear disease; cough with expectoration may be due to sinus trouble, or tonsillar infection and cough and hemoptysis may have their origin in a mitral stenosis of cardiac dilatation. Asthmatic like attacks may be due to pressure in cases of thoracic aneurysm, thymus enlargement, Hodgkin's disease or mediastinal abscess. He likewise reminds us that dullness at the left base may be due to a pericardial effusion or to a subphrenic abscess.

Thoracic Disease with Abdominal Symptoms. Brooks² calls attention to the frequency with which thoracic disease manifests itself by abdominal signs and symptoms. He comments particularly on the frequency with which sudden death from cardiac disease is diagnosed as "acute indigestion." A story of acute abdominal pain of sudden onset, with prostration, nausea and vomiting, when due to thoracic disease is not an indication of the acuteness of the thoracic lesion. This lesion may be of long standing and the acute abdominal symptoms are terminal. Close analysis of the history of such cases will usually show abundant premonitory warnings.

One of the most frequent methods of onset in *chronic pulmonary tuberculosis* is with gastro-intestinal signs and symptoms. Brooks emphasizes the importance of recognizing the fact that a complete picture of gastro-intestinal symptoms may indicate pulmonary tuberculosis and this fact must be borne in mind constantly as every gastro-intestinal clinic is seeing many such cases.

It has long been recognized that lobar pneumonia not infrequently manifests itself entirely by abdominal symptoms and that in not a few instances operations for a diseased appendix or gall-bladder have been performed.

Remer³ also warns against being deceived by the abdominal localization of pain. For example, when there is pain in the stomach for which no visceral cause can be discovered, the pleura should be investigated before assuming that there is an ulcer or gastric neurosis. Special search should be made for the presence of diaphragmatic pleurisy as an early manifestation of pulmonary tuberculosis.

Postoperative Complications of the Lungs. In reporting on these conditions, Mandl⁴ believes that the intramuscular injection of a digitalis preparation prior to the operation was of value. Thus postoperative complications occurred in but 8 per cent of 128 cases in which this was done, while they occurred in 27 per cent of 87 similar cases in which the digitalis was not given. He was surprised to find pulmonary complications so common after the use of local anesthesia; 12.1 per cent

¹ Missouri State Medical Association Journal, February, 1922.

² Medical Record, December 24, 1921.

³ Archiv für Verdauungskrankheiten, October, 1921.

⁴ Deutsche Zeitschrift für Chirurgie, July, 1921.

in 189 goiter operations; 26.7 in 97 cases given general anesthesia. The corresponding figures in herniotomies were 10.9 per cent in 227 cases with local anesthesia, and 9.8 per cent in 415 cases receiving general anesthesia.

He furthermore believes that, independent of the mode of anesthesia, the farther from the respiratory portion of the abdomen, the less frequently will these complications occur. Thus in 1379 abdominal and hernia operations, the general average was 14.5 per cent, while in 1585 operations on the head, limbs, breasts or rectum it was only 8.5 per cent. This, he believes, suggests the factor retention pneumonia, and the digitalis combats this by its action on the vessels in the lungs as well as in the digestive tract.

It seems to me a more rational explanation lies in the interference with the diaphragm. It is a recognized fact that abdominal operations, especially those in the upper abdomen, are often followed by a transient paralysis of the leaflet of the diaphragm on the affected side. This will sometimes produce physical signs markedly simulating pneumonia because the lower lobe of one lung is poorly expanded and partly atelectatic by reason of the diaphragm ceasing to function.

Extensive autopsy experience has convinced Brooks¹ that many cases of postoperative pneumonia in abdominal cases were really due to failure of diagnosis of a developing pneumonia, due to the predominance of its abdominal signs and symptoms. In most of these cases, a reasonable delay would have led to the correct diagnosis.

Physical Signs. Dutton² describes what he believes to be a valuable sign in the diagnosis of early tuberculosis. It is an abnormal inspiratory sound initiated by placing the lip and tongue in position as if to articulate the letter T then make the sound "shlu" by taking a full slow inspiration in an undertone or alternate. This inspiratory sound may be continuous or interrupted so as to consist of one, two or three parts.

Alteration in the position of the scapula is described by Tinker³ as a new sign for the diagnosis of pulmonary tuberculosis in children. Loss of muscle tone is given as the cause of the malposition.

In examining a chest in which there are marked physical signs on one side it must be borne in mind that the auscultatory sounds may be transmitted to the sound side. This is particularly true over the apices posteriorly. In this situation with distinct cavity signs at the right apex, the abnormal voice and breath sounds may be transmitted across the spine to the left side. Salomon⁴ has called attention to this propagation of sounds from the diseased to the normal side. If misinterpreted, it may deter one from producing an artificial pneumothorax under the belief that both lungs contain a cavity.

Mistakes can be avoided by noting the presence or absence of signs other than the auscultatory; and also by tracing the sounds from the point of maximum intensity as in the case of a diffuse heart murmur.

Persistence of Rales. It not infrequently happens in individuals

¹ Medical Record, December 24, 1921.

² Ibid., February 4, 1922.

³ Tubercle, February, 1922.

⁴ Bulletin de la Société médicale des hôpitaux, July 15, 1921.

with a localized lesion at the apex that fine crackling rales will persist when all symptoms have disappeared and the patient apparently has been restored to health. I have a number of people under observation at the present time in whom these rales have persisted for a number of years. They have no symptoms, and are leading a normal life. Lowenhjelm¹ points out that at the necropsies of persons with healed tuberculous lesions, dying from other causes, more attention should be paid to these persisting rales. He describes 3 cases in which the clinical cure has been doubted on account of rales continuing to be heard, but an autopsy showed that a complete cure had occurred. He quotes a similar case reported by Soderberg in 1909.

In 1 of Lowenhjelm's cases, the lumen of the bronchi were unusually large and the fibroid apex was clogged with desquamated epithelium, thus providing the physical conditions for rale production. A chronic bronchitis in the fibroid area might also, and probably does, perpetuate the rales. In addition, the rales may be caused by pleuritic conditions.

For these reasons, Lowenhjelm believes that we are inclined to attach too much importance to persisting rales; and in this I concur.

Rhinopulmonary Reflex. Echtman² calls attention to the fact that in a person with healthy lungs but with unilateral nasal obstruction there will be found some impairment of the percussion note in the posterior portion of Krönig's isthmus. This isthmus is a band of resonance which crosses the shoulder. Its narrowest point is at the top of the shoulder, and in both front and back it widens out to meet the extended areas of resonance beneath the clavicle and suprascapular fossa.

Echtman believes this sign may be of diagnostic value. In the healthy subject with unilateral nasal obstruction, the impairment, if present, should be only on the side obstructed. If, in spite of the unilateral obstruction, the impairment is found on both sides, tuberculosis should be suspected. If the nasal obstruction is on both sides, then no significance can be attached to the presence of the reflex bands of impairment.

Lubman³ recalls that some years ago he pointed out much the same thing. He states that when an examination of the chest reveals bronchial breathing in a small area in the third and fourth interspaces, nasal obstruction must be considered before pronouncing him or her tuberculous.

Displacement of the Trachea in Pulmonary Tuberculosis. In chronic tuberculosis, especially in those cases with marked fibroid changes, deviation of the trachea to the affected side is not uncommon. As a rule, it can be seen readily on inspection. In addition in this type of case, the esophagus and heart are also displaced. Pneumothorax may cause the same change.

Laubry and Block⁴ report two cases in which the displaced trachea gave signs of a pulmonary cavity.

¹ *Acta medica Scandinavica*, August 23, 1921.

² *Journal of the American Medical Association*, February 11, 1922.

³ *Ibid*, March 4, 1922.

⁴ *Bulletin de la Société médicale des hôpitaux*, December 28, 1921.

Sterno-mediastinal Dulness. Dulness over the manubrium and to either side of it is a common finding in cases of a dilated aorta, aneurysm, substernal goiter and a persistent thymus. Karczag and Molnar,¹ in alluding to these possibilities, also call attention to the fact that, normally, the right lung extends like a wedge back of the sternum. But with a destructive process in the right lung it shrinks and retracts, leaving an area of dulness at the sternum which no roentgen shadows of the sternum region can explain. The area does not clear up with deep inspiration as it does when the dulness is due merely to the unusual extension of the right lung to the left margin of the sternum.

Fever in Tuberculosis. It was a favorite saying of the late Dr. Trudeau that smoke was an indication of fire and in the same sense fever in a tuberculous individual meant that the disease was active.

Fever is unquestionably one of the most important symptoms of the disease. Its presence means activity and no one can be considered as cured until he is afebrile. This point is emphasized by Prest.² There is only one way to free a patient from fever and that is by absolute rest in bed. One can never predict how long this will take. An initial fever of 101° to 102° F. may subside in a few weeks; on the other hand, lower degrees of fever may persist for months. The all-important fact to keep in mind is that, no matter how long it takes, the rest treatment must be persisted in until the temperature is normal and remains so when the patient is given exercise. This rule should never be deviated from in early cases. In those with chronic advanced lesions, slight fever (99° to 99.2° F.) may be constantly present, and it may be impossible to free the patient of it. In such cases it is probable that the secondary infections are largely responsible for the fever.

The presence of fever is also most important in the diagnosis of early cases, with slight and indefinite physical signs. The use of the thermometer for a week or ten days may be the means of deciding whether suspicious signs are to be regarded as due to a latent inactive lesion or one that is alive and demanding treatment. Failure to make use of this simple expedient is the cause of many early cases escaping detection until the disease becomes well established.

Cantieri³ calls attention to a type of paroxysmal fever in latent tuberculosis. This may occur only occasionally and last a day or two or several days. He cites the case of a young girl in whom there were periods of fever up to 100° to 101° F., remittent or intermittent in type. These attacks occurred for several months with no other finding except endometritis, until finally an apical process became manifest and the girl succumbed in a few months. This patient's sister had similar attacks of paroxysmal fever. In another case, that of a boy, aged eleven years, the attacks of fever were ascribed to digestive disturbances. In spite of dietary regulations, the fever kept recurring until finally signs of pleurisy developed.

¹ Wiener Archiv für innere Medizin, January 20, 1921.

² Tubercle, July, 1921.

³ Rivista critica di Clinica Medica, September 25, 1921 (Abstract, Journal of the American Medical Association).

Hemoptysis. It is almost the universal practice to administer morphine in cases of pulmonary bleeding. This is done partly to allay the nervousness and partly to suppress the cough. Ehrenberg¹ disapproves of this, as he does not think coughing has anything to do with the hemorrhage and the use of narcotics prevents the expulsion of the blood. For the control of the hemorrhage, he advises putting a ligature around the extremities. The constriction should be only enough to produce a venous hyperemia. For this purpose a long stocking, which is always available, is satisfactory. If the bleeding continues, a band is tied around the root of each extremity and allowed to remain on for twenty or thirty minutes after the main coughing up of blood is past. The bands should be loosened gradually, one limb at a time. In addition, he gives salt or sodium bromide.

As already pointed out, the most efficient method of controlling pulmonary bleeding is by the induction of an artificial pneumothorax. This, however, is not always available. Under the circumstances, the plan recommended by Ehrenberg might be tried.

It is still believed by many that pulmonary hemorrhage in tuberculosis is commonly the result of exertion, with a resulting high blood pressure. Several years ago a Danish observer pointed out that, in his experience, congestion was the dominant factor, and that anything which brought about congestion, such as an acute cold, a tuberculin reaction, etc., was apt to cause blood spitting.

Boekhaudt² is convinced that the main factor in the production of hemoptysis is not high blood pressure, but stagnation in the bloodvessels, especially in the bronchi; often preceding the blood-spitting, there is a sensation of oppression and discomfort in the chest. Some clinicians make a practice of giving digitalis in cases of hemoptysis, but from another reasoning, aiming to reduce the hypothetic high blood pressure which they accept as the cause of the hemorrhage, as necropsy so often fails to disclose a rupture in any vessel.

Boekhaudt thinks that the apprehension of a hemorrhage often causes the patient to keep very quiet, suppress the cough and breathe gently thus tending to bring about a stasis in the bronchial veins.

He argues further that the reason why the hemorrhage usually stops abruptly when the blood has been coughed up, is because the coughing has shaken up the parts and put an end to the stasis. Contrary to the usual practice, he states that measures to prevent stasis and promote deep breathing and coughing will tend also to ward off an aspiration pneumonia.

Blood-pressure in Tuberculosis. It has been recognized since the introduction of modern methods of estimating the blood-pressure that in cases of pulmonary tuberculosis the pressure is below normal when the disease is active. In a study of 140 cases, Grant³ found that fluctuations

¹ Hygiea, December 31, 1921 (Abstract, Journal of the American Medical Association).

² Nederlandsch Tijdschrift voor Geneeskunde, July 30, 1921 (Abstract, Journal of the American Medical Association).

³ Tubercle, May, 1921.

in the pressure are noticed from time to time, but the general trend in advancing cases is downward. The diastolic pressure is less affected than the systolic and its variations are less reliable. When the minimum diastolic pressure reaches 60 mm. Hg, or lower, the general tone of the patient is poor and recovery is retarded.

If the systolic pressure is low, namely—90 to 100 mm. Hg the outlook seems better when the diastolic pressure shows a corresponding decline. But if it registers in such cases 70 to 80 mm. making a pulse pressure of about 20 mm., the outlook is not promising. Patients of this type are grave and have weak hearts.

Grant's observations were made on male ambulatory patients in whom the temperature chart failed to show any unfavorable signs.

In making routine examinations in health surveys, the findings of a low systolic pressure should render one suspicious of a tuberculous infection. Such cases should have a careful examination of the chest with this idea in view.

The findings of Grant are also borne out by those of Betchov and Farbarg-Vail.¹ These observers found in Switzerland, at an altitude of 1500 meters, that the average pressure in 15 healthy persons living near the sanatorium was 126 systolic and 75 diastolic. In 157 tuberculous patients the corresponding averages were 119 systolic and 74 diastolic. In those with a favorable outcome, it was 123 and 77; in 31 steadily progressing cases, it was 109 and 70.

A fairly good condition was maintained in 55 cases, with a pressure averaging 119 and 74. Fully 61 per cent of the cases with a systolic pressure above the average ran a favorable course, as also 58 per cent of those with a normal pressure. Only 32 per cent of those with a pressure below normal did well.

The systolic pressure was never found above normal in those with an unfavorable course; it was normal only in 8 per cent of this group while in 33 per cent it was below normal.

One fact brought out by their studies was that there did not seem to be any connection between the blood-pressure and a tendency to hemoptysis, nor did the prognosis seem to be affected by hemoptysis.

Tuberculosis Occurring Primarily in the Lower Lobe of the Lung. For years I have held the view that tuberculosis never occurs primarily in the lower lobe in adults. This opinion is based on a somewhat extensive clinical and postmortem experience. In 600 consecutive autopsies at the Phipps Institute there was not a single case in which there was any evidence that the disease had started primarily in the lower lobes. E. H. Funk informs me that in 150 autopsies in the Chest Department of the Jefferson Hospital their experience has been similar.

I have been asked to see cases in which such a condition was supposed to exist but in every instance while the signs were more marked about the angle of the scapula abnormal signs also existed at the apex.

Rosenblatt² has reported three cases in which lesions were supposed to be primarily basal. His opinion was based on physical and roentgenological

¹ Schweizerische medizinische Wochenschrift, August 16, 1921.

² Journal of the American Medical Association, June 11, 1921.

examinations. I must confess that in reading the case histories it is not at all clear to me that he has made out his contention. In all of his cases there were signs in the upper lobe, although not as marked as at the base. It must be remembered that the apical focus need not be large. No matter what its size, if present, one would hardly be justified in taking the ground that it was not the primary lesion.

Tuberculous Pneumonia. Tuberculosis of this type usually involves a large portion or all of one lobe. It is commonly described as an acute form of the disease in which death occurs within a few months. This, however, is not necessarily the case. I have seen the condition manifest itself exactly as a pneumococcus pneumonia, pursue a rapid course and death take place in two or three months. In other instances, it begins acutely, with high fever, and subsides in a few weeks, the temperature falling by lysis. It may then remain dormant for years. In still other instances the disease does not subside, but changes into the chronic ulcerative type of the disease, with cavity formation.

This conception of this type of tuberculosis is held by Rist and Ameuille.¹ They believe that when the initial process has a definitely pneumonic character, it should not be necessarily considered as a caseous pneumonia having an immediately serious prognosis. Before this position is taken, one should withhold judgment. This applies to all subsequent flare-ups, which should not be judged by their occasional violent beginning or by the extent of the initial lesions. In a general way, prognosis must not be based upon the quality of the lesion, but on the amount of tissue involved.

Traumatic Tuberculosis. One of the most frequent causes of damage suits is that of traumatic tuberculosis. An individual receives some injury, generally of a trivial nature, and later develops symptoms of pulmonary tuberculosis. Suit is then brought, commonly through the intervention of a designing lawyer. In the great majority of the cases, it is of long standing and had no relationship to the injury at all.

Bronardel and Giroux² are skeptical in regard to a traumatic origin of tuberculosis of the lung or pleura, except when it has followed after a violent contusion of the chest which arouses some latent focus which might never have been heard from otherwise. They urge supervision of persons known to have suffered from contusion of the chest, in order to learn what proportion ultimately develop pulmonary tuberculosis.

"Gassing" and Tuberculosis. At the end of the war there was a good deal of apprehension as to the effect gassing would have on the lungs, particularly in regard to the causation of tuberculosis. Nearly all chest specialists had a good many men, who had been gassed, referred to them to determine whether this had happened.

In differentiating pulmonary tuberculosis from the effects of gassing, Hawes³ warns against assuming that a given process is tuberculous even with a suggestive roentgenogram, and the reverse is equally true. If the individual presents the appearance of robust health, with marked symptoms, tuberculosis is not apt to be the cause of the trouble.

¹ Paris médicale, January 7, 1922.

² Bulletin de l'Académie de médecine, November 8, 1921.

³ Boston Medical and Surgical Journal, June 30, 1921.

As a rule, the lung sequelæ from gassing are basal and not apical processes and the signs usually encountered are those pointing to a thickened pleura or a localized bronchitis.

An important point to remember is that, following gassing, there is apt to be a marked increase in nervous symptoms of every kind. Therefore do not assume that men who have been gassed, and who are not tuberculous, are not ill and in need of treatment. While the lungs may be unimpaired, the man may need attention because of his nervous system.

Prenatal Tuberculosis. At one time it was currently believed that tuberculosis was an inherited disease. Of late years, however, the opinion has prevailed that the disease was so rarely inherited directly that it was a negligible factor. In reporting a case of disseminated miliary tuberculosis in a stillborn fetus, Whitman and Greene¹ include a study of the literature. By combining various statistics previously made and adding recent reports, they find that there are about 120 cases in which tubercle bacilli or the histological evidence of tuberculosis were found in the placenta or fetus. In addition, there are 519 more or less doubtful cases of prenatal tuberculosis. They conclude therefore that:

1. Prenatal tuberculosis has ceased to be a mere curiosity of the laboratory, and has become a pressing problem of the sanitarian.
2. The facts at hand are significant enough to command the active employment of every agency by which further facts may be elicited.
3. To the extent that the spread of the disease is due to prenatal, rather than postnatal, infection, present methods of control must be revised and amended, even at the expense of those sentiments of compassion and tolerant forbearance by which our present efforts are so notably handicapped.

Heredity in Tuberculosis. This factor in the causation of tuberculosis once was looked upon as the greatest importance. It was then discarded and considered to play no part whatever. Recently, however, the question of hereditary influence has been revived. Lewis,² in association with Sewell Wright, has for the past two years been conducting some interesting experiments at the Phipps Institute.

In their studies with infected guinea-pigs of known ancestry, long closely inbred, Lewis and Wright, noted in one family, a notably greater resistance to tuberculosis, as indicated by length of life after inoculation, than any of the other families under observation. This resistance was an inheritable quality, transmitted by either sex in crosses with other inbred families of less resistance. The factors which determine resistance to tuberculosis did not seem to be closely related to other evidences of vigor, such as rate of growth and adult weight, and size of litters.

In crosses involving the resistant family with less resistant families, the offspring seemed to be more resistant than even members of the resistant family itself, indicating the dominance of resistance over susceptibility. Their work so far points strongly to the fact that heredity is to be reckoned with and may determine to some extent the resistance of a given family to tuberculosis.

¹ Archives of Internal Medicine, February, 1922.

² American Naturalist, 1921, 55, 20.

Marital Infection. At one time this was believed to be a common occurrence. Some years ago, Pope analyzed a very large number of cases and concluded that infection from husband to wife or *vice versa* was no more frequent than that occurring in people not so related. Of recent years this belief has been strengthened because of the almost universal acceptance of childhood infection and the rarity or impossibility of adult infection. It is to be noted, however, that the belief in adult infection has been gaining more and more adherents and, at the present time, there are many who think that this deserves serious consideration.

Barnes¹ has made an interesting contribution on the subject. He concludes that:

1. The histories of 229 consecutive widowed patients admitted to the Rhode Island State Sanatorium, 1905 to 1921, show that 93, or 40 per cent, lost their consorts by death from tuberculosis, a tuberculosis mortality over three times that of the married people of the community.

2. Immunity from many diseases is short-lived and until much more convincing evidence of permanent immunity against tuberculosis conferred by childhood infections is forthcoming, a cautious logic will not accept the confident statements that are being made as to the impossibility or rarity of adult infection.

Pregnancy and Tuberculosis. This is a subject which is of interest to every general practitioner of medicine. Pregnancy is a common occurrence, tuberculosis is one of the most commonly encountered diseases; it is therefore inevitable that the two conditions will be frequently encountered. In a study of sanatorium patients, Stewart² shows that tuberculosis was 20 per cent greater in mothers than in 1900 other patients. Breakdowns occurred during the pregnancy in 25 per cent; during the month following labor in 24 per cent; during the next twelve months in 36 per cent; and in the interval between childbirth cycles in 15 per cent of cases. Making all allowances in these and in numerous reported cases, Stewart states that the conclusion cannot be avoided that childbirth has a definite role in favoring the progress of tuberculosis. Even if, during pregnancy, metabolism should be improved, the demand is also increased. If the pressure upon the lungs and other viscera is of some benefit, the sudden removal of this pressure at parturition is correspondingly harmful. The overstrain and violent respiratory efforts force infective material from old foci into new living areas; new areas of infiltration are found at autopsy in these cases.

It is in these last-named factors that Stewart sees the danger to the woman and not the belief that childbirth creates any specific predisposition.

Stewart emphasizes the statement that while motherhood in a normal woman is a normal function, in a weak or ill woman, it is pathological.

Norris and myself have been interested in this subject for some years. We have had the opportunity of observing a large number of tuberculous pregnant women at the Phipps Institute. As I have already stated, the subject is of the utmost importance to the general practitioner. In

¹ American Review of Tuberculosis, October, 1921.

² Canadian Medical Association Journal, January, 1922.

the first place, a woman who has had a tuberculous lesion which is to become arrested should be warned of the danger of pregnancy. At least three or four years should elapse without symptoms. In the event of a tuberculous woman becoming pregnant, three views prevail: (1) That the pregnancy should be terminated in all cases; (2) that it should never be interfered with; (3) that the woman should be carefully observed, and, if she shows no signs of the pulmonary disease becoming active, allow the pregnancy to continue. If, on the other hand, she develops fever, loses weight, begins to cough, etc., the pregnancy should be interrupted, providing, after a period of rest, the symptoms do not abate. This applies to the first four months. If the pregnancy has advanced beyond four months, interference is not to be thought of, as emptying the uterus beyond this period is a major operation and will prove more harmful than allowing the pregnancy to continue. At the Phipps Institute we have followed the conservative plan of studying each individual case. In an experience of eight years, we have not had to resort to the radical plan of emptying the uterus a half dozen times.

Roentgen-ray Diagnosis of Tuberculosis. When the roentgen rays were first employed in the diagnosis of chest conditions, the most extravagant claims were made by those practising this specialty, and it was freely predicted that the days of the stethoscope and physical diagnosis were ended. An occasional ultra-enthusiast is still to be found but, generally speaking, a more conservative stand is now adopted, although there is still something to be desired in this regard.

Staub-Oltiker¹ concludes after a roentgenological study of over 2000 cases that while radiography is important, if trusted alone, it will lead to the grossest errors.

Wilkins² points out that in some cases the earliest evidence of disease will be detected by the physical examination; in others, the roentgen ray will furnish the diagnosis. This is in accord with my experience. In the well-marked case the roentgen rays are not needed for diagnostic purposes as the clinical signs and symptoms give the necessary information. What the roentgen rays do in such cases is to indicate the extent of the lesion.

Wilkins points out that the discovery on the plate of indications of pathological changes in the tissues always requires the support of clinical evidence. This is particularly true in doubtful cases. It is well to keep in mind that the roentgen rays do not give an etiological diagnosis and it is in this type of case that one particularly wants assistance. One might also mention the changes occurring in the lung as the result of the inhalation of inorganic dust (pneumoconiosis). One unfamiliar with this condition is apt to consider it as being tuberculous, and even the experienced observer may be in doubt without a knowledge of the occupation of the individual.

Wilkins alludes to the fact that the roentgen-ray picture will usually indicate whether the lesion is active or not, although he believes this should be left to the clinician. With this statement I would take issue.

¹ Schweizerische medizinische Wochenschrift, October 20, 1921.

² Canadian Medical Association Journal, November, 1921.

I do not believe that it is at all possible from the roentgenogram to form any idea of whether the process is active or inactive.

Lymph Node and Pulmonary Tuberculosis. It has long been known that tuberculosis of the cervical-lymph nodes tended to remain localized and that the disease did not, as a rule, spread to other tissues. From a long experience, Williams¹ has observed that the members of families with an inherited predisposition to tuberculosis who suffer from cervical lymph-node disease leading to suppuration do not contract pulmonary tuberculosis or any other form of the malady. On the contrary, other members of the same family without lymph-node disease, and often the most robust, frequently develop consumption. The conclusion he draws is that the absorption of tubercle bacilli from the mouth, when conveyed by the lymphatic vessels and arrested in the nodes, as indicated by these nodes breaking down, leads to the production there of a type of bacillus capable of curing consumption, and conferring immunity without the bacilli themselves going beyond the lymph nodes.

Tracheo-bronchial Tuberculosis. For some years this has been a relatively frequent diagnosis, with little to warrant it. The diagnosis is usually wrong and lacks the seriousness which many attach to it. Balyeat² draws the following conclusions among others: (1) That a positive d'Espine sign is indicative of enlarged lymph nodes at the hilum; (2) that enlarged tracheo-bronchial lymph nodes may be due to several causes, the chief of which is the tubercle bacillus; (3) that chronic bronchitis will produce enlarged tracheo-bronchial lymph nodes which can be differentiated from a tuberculous hilum by means of the roentgenogram; (4) that a positive d'Espine sign found in a poorly nourished child usually is evidence of a tuberculous infection of the hilum; (5) that the degree of infection can be determined by the roentgenogram.

I would disagree with all of these conclusions. During the past year I have worked on a committee of six (three clinicians and three roentgenologists) the object of which was to establish a normal chest standard in children from six to ten years of age. The committee worked in pairs, one clinician and one roentgenologist, in three different cities. At a final meeting the results were compared. The report of this committee was made at the recent meeting of the National Tuberculosis Association. It was agreed, among other things, that d'Espine's sign was worthless. It depends too much on the interpretation of the individual observer and is, in addition, found when there is no indication of lymph-node enlargement and is absent when such enlargement is present.

It was also agreed that any acute infection involving the respiratory tract could, and did, produce enlargement of the lymph nodes. Furthermore, the roentgenologists agreed that such enlargement could not be recognized as being tuberculous by the roentgenogram alone.

The estimation of the degree of infection, as indicated by the hilum shadows, is equally precarious. As a matter of fact, the hilum shadow is a sealed book, unless abnormally large or abnormally dense.

¹ British Medical Journal, January 29, 1921.

² Journal of the American Medical Association, April 9, 1921.

Ruppel,¹ for example, has seen in a number of cases the final subsidence of what seemed to be tuberculous enlargement of the nodes at the hilum in both children and adults, showing that this was merely a sequel of influenza. With true tuberculous enlargement of these nodes the paucity of the physical findings is often in direct contrast to the extensive change shown by the roentgen rays.

Artificial Pneumothorax in the Treatment of Pulmonary Tuberculosis. When this method was revived some ten years ago, it was widely used, and certain enthusiasts at that time advocated its employment in all cases. Even in very early cases it was urged on the ground that it would shorten the length of time necessary to keep the patient under treatment. Ten years' experience have defined fairly clearly the limitations of the procedure. During the past year a number of communications have appeared. Peers² defines clearly the indications.

1. No patient should be submitted to the operation without first having been given the benefit of ordinary measures for two or three months or longer.

2. Pneumothorax should be attempted only when, as far as can be ascertained, the patient will not recover under ordinary methods. This applies particularly to the progressive type of case which fails to improve in spite of everything done.

To these two requirements I would add a third, namely—the use of artificial pneumothorax for the control of pulmonary hemorrhage. There can be no question as to its effectiveness in this condition and indeed it may be said to be the only certain method we possess.

Begtrup-Hausen³ states that in 10 of 11 cases the *hemoptysis* was merely an additional indication for the pneumothorax. The hemorrhage was arrested at once and it never returned in the 6 cases of complete collapse. In the others, further treatments were needed. In the eleventh case pneumothorax could not be performed because of adhesions. The patient died shortly after of pneumonia and the autopsy revealed the fact that the bleeding came from the supposedly sound lung. This happened in a case under my care and probably is the explanation of the occasional failure to arrest the bleeding.

Granting that the treatment should be used, the question always arises as to whether the lung is free from adhesions and can be compressed. Peers, in a series of 91 consecutive cases, found that 25, or 27.5 per cent, could not be compressed at all because of adhesions; 32, or 35.1 per cent, could be partly compressed only; and that in 34 cases, or 37.4 per cent, he was able to secure complete compressions.

Jacobaeus⁴ has devised a method of severing the pleural adhesions in order to bring about collapse of the lung. He employs the thoracoscope which enables him to examine the anterior of the pleural cavity in the same manner as the bronchoscope is used. The thoracoscope is intro-

¹ Medizinische Klinik, July 17, 1921.

² California State Journal of Medicine, August, 1921.

³ Ugeskrift for Læger, March 31, 1921 (Abstract, American Review of Tuberculosis).

⁴ Acta Chirurg. Scand., March 7, 1921 (Abstract, American Review of Tuberculosis).

duced through a cannula and an outline sketch of the bands of adhesion is drawn to serve as a map. With this as a guide, the actual cautery is introduced through the cannula and the adhesions severed. He has carried out this procedure in 40 cases and in 75 per cent of them the adhesions were sufficiently broken up to permit of effectual compression of the lung by pneumothorax, which otherwise would have been impossible.

Saxtooph¹ reports on 200 cases of pulmonary tuberculosis in which attempts were made to induce pneumothorax. An effectual pneumothorax was obtained in 108 cases, and two years later 47 of these were still living. Of the total number, 33 per cent are living and in good health from two to six years afterward with full earning capacity restored. Only 3 are still living of the 34 in whom only partial compression of the lung could be induced. His cases were all women and almost exclusively those of the wage-earning class.

It is not to be forgotten that artificial pneumothorax is not without danger. Sudden death sometimes follows the procedure. Giese and Conway² report such an instance in a tuberculous individual who had had six previous injections. At the seventh operation alarming symptoms developed some minutes after the introduction of 200 cc of sterile air at the site of previous punctures and immediately following a second puncture in an adjoining interspace. At no time did the manometer record a positive pressure. The symptoms, marked and well defined, were undoubtedly cerebral. Although there was a probable injury of the lung at the time of the second puncture, none could be demonstrated. Death occurred twenty-four hours following the operation. Death was attributed to a pleural reflex.

The cause of these sudden accidents following a procedure that is, as a rule, apparently harmless is not easily explained. Indeed many, because of the simplicity of the operation, have lost sight of the existence of pleural reflexes. An editorial article³ states that:

"Hypotheses are not wanting for explaining these reactions, and although some are ingenious their very number sufficiently shows the complexity of the phenomena and the difficulties encountered when their internal mechanism is to be explained. There are the toxic theory, and the theories of sudden depression, embolus, and cerebral anemia, the uremic and the reflex theories, to mention the more important. In certain remarkable experiments Cordier has shown the capital part played by reflexes in the production of these accidents, the starting point of which is the irritation of the pleural terminal filaments of the pneumogastric nerves. It would seem to be a fact that this nerve is alone concerned and not the phrenic, intercostals, or sympathetic, as many have supposed. Syncopal or convulsive phenomena, hemiplegia or paretic accidents, vasomotor disturbances, minor and major nervous accidents, observed both clinically and experimentally in lesions of the pleura, are all phenomena of the same order."

¹ Ugeskrift for Læger, June 2, 1921 (Abstract, Journal of the American Medical Association).

² Colorado Medicine, July, 1921.

³ Medical Record, April 23, 1921.

My own experience may be unique, but 4 patients in whom I have advised artificial pneumothorax died suddenly, 3 of them within a few minutes after the puncture. The operation in all of them was performed by an experienced and competent man. As a result, when I advise this operation I warn the family that while the danger is minimal, still there is a possibility of an untoward result.

Rupture of the lung at the site of a diseased area is also a possible accident which may result in an empyema. Roch and Saloz¹ report a case in which such an accident occurred. Shortly after the introduction of artificial pneumothorax a rapidly progressive case was given the treatment. A little later signs of effusion developed which proved to be an empyema. At the autopsy, a rent was found in the lung which had apparently been caused by the tearing of the pleura when the lung was collapsed.

In a study of the roentgenographic findings in the opposite lung, after artificial pneumothorax, Simon² found there was an increase, and in so short a time as nine days after this treatment, but that they would not appear to be due to actual pathological changes. He believes these increased roentgenographic findings are due to the intensification of the already-existing pathological changes, and are in some way dependent upon the pressure from the treated side exerted against the mediastinum. After prolonged treatment there is a diminution of these findings which, he thinks, would indicate a decrease of the pathological changes in the lungs in these cases. Simon concludes that bilateral involvement alone does not necessarily contraindicate the use of artificial pneumothorax.

Shortly after the introduction of artificial pneumothorax, it was found that pleural effusions commonly developed. Many of the early workers regarded them as a serious complication, but they are now looked upon without apprehension.

Stivelman and Rosenblatt³ encountered pleural effusions in more than 50 per cent of their cases. They conclude that the immediate effects of a serous effusion following artificial pneumothorax are usually beneficial, but ultimately they cause premature reëxpansion of the lung and obliteration of the pleural cavity. It is, therefore, unwise, in their opinion, to discontinue the treatment and adhere to the dictum of "leave effusions alone." Small transitory effusions can be disregarded; moderate effusions, which do not displace the mediastinum, need not be aspirated, but the pneumothorax treatment should be continued with increasing intrapleural pressure in order to prevent obliteration of the pleural cavity. Large effusions should be aspirated and replaced by sterile air or nitrogen gas. Purulent effusions should always be aspirated and replaced by air, not only because of their toxicity, but also on account of their tendency to produce extensive adhesions and obliteration of the pleural space. Dunarest and Parodi,⁴ in discussing these effusions, state that the tuberculous toxins from the compressed focus spread to the pleura which reacts with an effusion.

¹ Schweizerische medizinische Wochenschrift, June 23, 1921.

² American Review of Tuberculosis, October, 1921.

³ Journal of the American Medical Association, July 2, 1921.

⁴ Policlinico, July 18, 1921.

Peters¹ states that in the majority of patients receiving pneumothorax treatment, a serofibrinous effusion develops sooner or later. A small percentage of these effusions become purulent, and, finally, a still smaller percentage become true empyemas. The occurrence of fluid in the "gas chest" is identical with the formation of fluid in the average tuberculous pleurisy, giving rise to the same symptoms, but the purulent effusion is perhaps more often noted in lung compression than elsewhere. The treatment should be expectant. Removal of the fluid should be performed only when necessary to relieve pressure symptoms. Peters states that the average case with sterile pus recovers as easily and as quickly as the average patient with only a serofibrinous effusion. When a true empyema develops, he believes it should be treated by drainage, and even then the prognosis is usually hopeless.

In an analysis of 10 cases of *tuberculous empyema*, Kalb² states that 2 were subjected to a thoracotomy and both died. Of the remaining 7, 2 were instances of a spontaneous empyema and the remaining 5 followed pneumothorax treatment. All of these cases were treated by removing all the purulent material possible by aspiration or siphonage, or both, and using a large needle. Following this, a 2 per cent solution of liquor formaldehyde in glycerin was injected, the amount varying according to the amount of fluid withdrawn. All 7 of these cases are alive and free from the complication.

While an effusion on the treated side is common as a result of artificial pneumothorax, de Reynier and Rossel³ state that up to the present time only 2 cases have been reported where this occurred on the opposite side. They add 2 additional cases, and draw the following conclusions: (1) Effusion on the opposite side is an independent complication and is not caused by irritation of the mediastinal pleura; (2) such effusions are serious but not necessarily fatal; (3) the evolution of such pleurisy is identical with that of ordinary pleurisy; (4) treatment should be symptomatic.

Lung Calculi. It is well known that tuberculous lesions in the lung often become surrounded by deposits of calcium salts. This is one of the ways in which the disease is walled off and rendered harmless. Not infrequently these concretions are expectorated. Within the past few months several patients have shown me calculi varying from the size of a pin-head to a split pea. Burger⁴ has reported a case in which a calculus ulcerated through the wall of a large bronchus, and was removed through the bronchoscope. At the first examination with the bronchoscope the wall of the bronchus was seen bulging inward. Then the calculus ulcerated through and became visible. A final inspection after removal showed the wall of the bronchus healed. In 1914 Mann reported 10 cases in children and 5 in adults in which a lung calculus had broken through into a bronchus and was caught up or removed.

Blastomycosis of the Lung. This form of mycotic infection may be said to be endemic in, and about, Chicago. Isolated cases may be encoun-

¹ American Review of Tuberculosis, September, 1921.

² Ibid., June, 1921.

³ Revue médicale de la Suisse romande, March, 1921.

⁴ Nederlandsch Tijdschrift v. Geneeskunde February 25, 1922 (Abstract Journal of the American Medical Association).

tered, however, in any locality. As we have repeatedly emphasized, the detection of any one of the mycotic infections depends on keeping in mind that when a patient presents every evidence of having tuberculosis and yet tubercle bacilli cannot be found in the sputum, search should be made for some one of the so-called mycotic organisms. In the case of blastomycosis, a clue as to the cause of the pulmonary symptoms is often furnished by skin lesions. This organism commonly attacks the skin, producing a rather characteristic lesion.

The skin lesions may appear in the form of subcutaneous abscesses or pustules; the latter are usually multiple and may occur secondarily or in crops, the lesion may first appear as an ulcer, or the ulcer may develop in the site of a ruptured abscess. The ulcer is usually surrounded by an areola of inflammation; the margins are raised and irregular, and the base is soft and covered with granulation tissue, which may become fungoid and approach the surface, later assuming a papillomatous appearance, which is more or less characteristic of the lesions of chronic blastomycosis of the skin. Furthermore, as the lesion spreads peripherally, it tends to heal in the center.

In many cases the skin lesion is associated with visceral involvement, particularly the lungs. Two such cases have been reported by Howes and Morse¹ of Detroit.

Streptothrichosis of the Lung. Infection of the lungs with some one of the several varieties of the streptothrix group is not unusual. The streptothrix group is composed of a number of organisms which vary greatly in pathogenic power. Some cause no disturbance whatever and are, for the most part, secondary invaders. Thus, in many cases of tuberculosis the streptothrix can be demonstrated in the sputum. In such instances, the organism is not in the least acid-fast. At the other end of the scale is the form which is almost as resistant to acid as the tubercle bacillus. It is such cases that sometimes are mistaken for tuberculosis because of the fact that the streptothrix is not decolorized by Gabbett's stain which is so commonly employed in examining sputum for tubercle bacilli.

In common with other mycotic infections, the reported cases are usually single observations. Lenhartz² observed a man, aged thirty-three years, who had what seemed to be a croupous pneumonia but because of its persistence was later taken to be a tuberculous infection. He had continuous fever (102° F.) for eight weeks and later it became intermittent. Pus was finally obtained by puncture, and the streptothrix obtained in pure culture, both by anaerobic cultivation and by animal inoculation. Later a rib was resected and three-quarters of a liter of pus evacuated. The man made a good recovery but a few weeks later succumbed to an attack of erysipelas.

At the necropsy, the typical lesions of a streptothrix infection were found.

Pulmonary Actinomycosis. It is estimated that about 18 per cent of all cases of actinomycosis are associated with pulmonary lesions. Re-

¹ Boston Medical and Surgical Journal, September 8, 1921.

² Deutsches Archiv für klinische Medizin, June 7, 1921.

ported instances of pulmonary involvement in this country are not numerous. In common with other mycotic infections, it is likely that many are overlooked because of their close resemblance to tuberculosis. Noussac¹ states that the lung lesions are varied, usually being characterized by proliferation of the connective tissue, which may be so marked as to resemble sarcoma. Here and there miliary abscesses may occur, or there may be larger inflammatory areas, leading to caseation. In other instances, the lesions may be those of a bronchopneumonia. A characteristic feature is the non-involvement of the bloodvessels, which may pass through an abscess without being opened. Typical actinomycotic granules may be seen in the pus. In advanced cases the lesions may show sclerosis with retraction, atelectasis or hepatization. There is usually an associated chronic pleurisy.

A not uncommon feature is for the process to extend through all barriers and perforate the chest wall. In this respect it differs from tuberculosis which is stopped by the thickened pleura and only very rarely perforates externally.

The symptoms and physical signs are those of an insidious pulmonary affection (cough, expectoration, fever, loss of weight, etc.) and are not to be distinguished in many cases from those caused by tuberculosis.

The recognition of this condition rests largely on the sputum findings. In a case presenting the features of pulmonary tuberculosis but with persistent absence of tubercle bacilli, the sputum should be searched for the so-called sulphur granules and the ray fungus.

The prognosis is grave; iodide of potassium is recommended and occasionally it brings about a cure.

Pulmonary Aspergillosis. In the United States this is regarded as a rare condition, and this would seem to be justified by the few cases recorded in the literature. Lapenta² is of the opinion that it is not as rare as usually believed. As he observes if the sputum were more frequently examined in cases in which the respiratory trouble seems to be tuberculosis but in which tubercle bacilli are absent, the mycotic infections would be more frequently found. He reports five cases in which the *aspergillus fumigatus* was the source of the trouble. It is important to make a correct diagnosis in these cases as iodine seems to be specifically destructive to the life of the aspergillus.

Lapenta employed the iodine in the form of the iodides of potassium and sodium, by mouth and by intravenous injection. For the intravenous treatment sodium iodide, in dose of 1 or 2 gm. in 25 cc of saline solution (properly sterilized and filtered) is recommended.

Proper hygienic treatment should also be carried out, the feeding forced and the relief of symptoms given attention. He states that under the use of iodides the infection has cleared up in the course of four or five weeks.

Of the 5 patients Lapenta reports, 3 have remained well over two years. In the remaining 2 there have been recurrences after a few months; 1 of these was complicated by tuberculosis.

¹ International Clinics, 1921, series 31, 3, 1.

² New York Medical Journal, December 7, 1921.

Moniliasis (Bronchomoniliasis, Broncho-pulmonary Moniliasis). During the past year or so, a number of reports have been made on this form of yeast infection. It is common in certain parts of the Far East, particularly Siam. Mendelson¹ states that in the City of Bangkok, where the weekly deaths reported as due to *tuberculosis* average from 15 to 33 per cent of the total deaths reported, it is interesting to note that of a series of cases numbering 100 in all, presenting themselves at one of the local hospitals for treatment for tuberculosis of the lungs, 5 per cent proved to be mycotic, 23 per cent spirochete infections, and the remainder classified as tuberculosis, although in only 10 per cent could the tubercle bacillus be demonstrated. The monilia was the chief offender among the mycotic group.

The figures given by Mendelson are paralleled by those of Najib U'ara² in Egypt. He found the monilia in 4 of 67 cases of chronic bronchitis, the bronchial spirochete in 23, and the tubercle bacillus in 27. The moniliasis cases generally presented the picture of an ordinary chronic tracheo-bronchitis, but in 1 case there was a succession of attacks resembling pneumonia, with paroxysms of coughing and hemoptysis, and a fatal termination in a little less than three years.

Castellani, Douglas and Thomson,³ in commenting on a form of *bronchitis* clinically resembling tuberculosis, discuss broncho-hemisporeiosis, broncho-anaëromycosis and broncho-moniliasis. In the later group they encountered the *Monilia tripiculis*, *Monilia pinoyi*, *Monilia metatondinensis* and *Monilia krusei*. All of these were originally described by Castellani and "his detailed classification according to the many sugar reactions stands as a monument to years of research and scientific observation."

Sur⁴ reports a case of moniliasis in which the organism conformed to all the characteristics of *Monilia tropicalis* as described by Castellani. The organisms consisted of budding forms of yeast-like cells, resembling *Saccharomyces*, but mycelial threads as well were always found. The filamentous hyphæ showed only intramycelial endospores but formation of ascus was not observed. The budding and growing cells at first assume a moniliform character and later on grow into long, delicate, filamentous threads and form a mycelium. Neither the cells nor the filaments are acid-fast. In liquid glucose, maltose and saccharose mediums the organism produces acid and gas but shows no change in lactose, mannite or dulcitate media. The litmus milk shows only acid but no clotting. In peptone water and nutrient-broth mediums, the growth forms a deposit at the bottom of the tubes, the medium fluid remaining clear.

The *pathology* of moniliosis has never been fully described. Mendelson⁵ states that in the cases he has observed in the postmortem room, the lungs on section closely resemble a tuberculous infection. The

¹ Journal of the American Medical Association, July 9, 1921; Military Surgeon, July, 1921.

² Presse médicale, September 7, 1921.

³ Journal of Tropical Medicine and Hygiene, June 1, 1921.

⁴ Indian Medical Gazette, December, 1921.

⁵ Loc. cit.

small "tubercles," which in reality are mycotic tumors, stand out as very prominent white masses. (This description conforms closely to that of blastomycotic lesions of the lung which I have seen.) Although the blood supply is completely cut off from the filbert-like growths, yet there seems to be no necrosis, and it is possible that the surrounding tissues indirectly supply nourishment. The small growths can be teased apart and seem to be made up of old connective tissue. As many specimens were examined without observing any lungs in which necrosis had taken place, Mendelson is of the belief that the fungi, at least those found in Siam, have, in the beginning, a stimulating effect on the tissue cells. Whether or not there is, later on, a degeneration with the production of local abscess with its other manifestations, Mendelson is unable to say; but in view of the fact that mixed infections of old standing present on postmortem examination the same firm connective tissue tumors, it is doubtful whether these growths, except under the most adverse conditions, break down.

While in the great majority of instances the mycotic infections are alone responsible for the lesions found at necropsy, a case is occasionally found where it is associated with tuberculosis. Macfie and Ingram¹ report the case of a man who died as the result of a pulmonary hemorrhage; at the necropsy, both lungs were found to be tuberculous. The left lung was collapsed, and the pleural cavity partially filled with an exudate. In this exudate and in the thickened pleura over the lung, monilia was present. This organism in its biochemical reactions closely resembled the *Monilia mivea* of Castellani. Several years ago Wells, of Chicago, told me of a case he had autopsied in which both tuberculosis and *blastomycosis* existed in the same lung.

Moniliasis occurs in an acute and a chronic form. The average acute case presents the signs and symptoms usually encountered in acute bronchitis. These are slight fever, an irritating cough, large amounts of mucous or mucopurulent sputum and a general feeling of illness.

In the chronic cases the clinical picture is similar to that encountered in tuberculosis or *spirochetosis*. Indeed in many cases the similarity to tuberculosis is so close that the diagnosis can only be made after laboratory examinations. This, of course, is true of all of the mycotic infections.

Mendelson says that prognosis in the chronic cases is similar to that in tuberculosis. There is no specific, although potassium iodide is commonly recommended.

Mendelson expresses the belief that the condition may be more common in the United States, especially in the South, than is thought. He urges the examination of the sputum for monilia in all cases presenting the picture of tuberculosis but absence of tubercle bacilli.

Sporotricosis of the Lung. Infection with the sporothrix in human beings is usually in the form of cutaneous lesions. The great majority of the cases (numbering about 75) reported in this country have been observed in the Mississippi Valley. Pulmonary infection with this organism is rare, the reported cases being less than 10.

¹ Annals of Tropical Medicine and Parasitology, April 27, 1921.

Stansfield¹ reports the case of a girl, aged eighteen years, who had had from infancy attacks of shortness of breath and wheezing. These attacks came on suddenly, usually at night, without apparent cause and lasted for two or three days. A roentgen-ray examination of the chest showed some thickening at the lung roots and larger bronchi, but no other evidence of pulmonary disease.

The sputum was thin, watery and colorless, with many white or pale-yellow pinhead-sized flakes in it. Examination of these flakes showed the presence of mycelia and yeast-like cells. The yeast-like organism grew rapidly at room temperature and at 37° C. and presented the characteristics of a sporothrix. The patient was given sodium iodide in large doses for several months with apparent recovery from her symptoms.

Pulmonary Botryomycosis. This is an unusually rare infection so far as this country is concerned. In common with certain other of the mycotic infections, it usually affects the skin surfaces. It is best known to veterinarians as pedunculated fibrous granuloma. In the first case described by Bollinger, in 1870, the lung of a horse was the seat of the disease. Human cases have been reported in France, Italy and Switzerland, but the disease is seen most frequently in Northern Africa and in Morocco.

McJunkin² reports a case of pulmonary involvement which is of interest as it occurred in the same locality from which a previous one with localization in an internal organ was reported. McJunkin's case was that of a male infant, aged four months. The family history was negative. The child had always had a hacking cough which had become much worse six weeks prior to coming under observation. The fever was high for a time. Later, it ranged about 99.2° F. The percussion note was impaired all over the right lung; on auscultation, the breath sounds were suppressed with fine crackling rales. The leukocytes numbered 20,000, with 62 per cent eosinophiles. The von Pirquet test was repeatedly negative.

At the autopsy, there were found centimeter areas of a dark bluish color, most of which were in the posterior portions of the right lung, the other organs were free.

Histologically, the pulmonary lesions revealed the presence of giant-cells of the type seen in tubercles and of peculiar dark masses which consisted of Gram-positive coccoid organisms embedded in a hyaline, eosin-staining matrix.

Cultures on blood-agar plates made from the bronchial exudate gave a heavy growth of Gram-positive cocci which presented the usual appearance of *Staphylococcus albus*. Two views are held in regard to the organism—some regarding it as the usual staphylococcus, others as a specific coccus.

Pulmonary Distomiasis. In certain portions of the Far East (China, the Island of Formosa, Japan) infection with the lung fluke is quite common and in these endemic centers must always be considered in

¹ Boston Medical and Surgical Journal, December 1, 1921.

² Archives of Internal Medicine, April, 1921.

patients suffering from cough, blood spitting and abnormal pulmonary findings. The infection is caused, in some instances, by drinking infected water, but the majority of cases result from the eating of raw or partially broiled crabs which are infected with the cercariae. It is also well known that cases of pulmonary distomiasis not infrequently develop brain complications.

Kawamura and Yamaguchi¹ report 36 cases with brain complications. The distoma egg was found in the sputum in 8 cases. These cases had been diagnosed by local physicians as instances of cerebral infantile paralysis, or encephalitis, or acute meningitis.

When the brain is involved, there may be the sudden development of severe headaches, vomiting, and dizziness. In many cases there are epileptic attacks with loss of consciousness and at times delirium, or there may be tonic or clonic spasms, with aphasia or motor paralysis. These attacks may be repeated several times, and may last even ten or fifteen days. Some of the epileptic attacks are distinctly Jacksonian in type. The initial symptoms disappear gradually, but some of the cases may retain disturbances of sensation or movement of the extremities. In rare cases aphasia may develop, or there may be disturbance of or loss of sight. The mentality is weakened in some cases and, in those most seriously affected, idiocy may result. As a result of these brain complications, not a few die.

In patients showing brain symptoms, Kawamura and Yamaguchi state that more than half have abnormal physical signs in the chest and distoma eggs in the sputum.

Hydatid Disease of the Lungs. This disease is rarely encountered in this country. It is, however, very prevalent in those localities where human beings are brought into close contact with dogs, as for example sheep herders. For this reason hydatid disease of the liver and lungs is frequently encountered in sheep-raising countries, such as the Argentine and Australia.

Hydatid disease of the lungs may cause little, or no trouble—the cyst being accidentally discovered as the result of a roentgen-ray examination; in others, the cyst may rupture and its contents and membrane be spontaneously expelled; in others, operative interference is necessary to relieve the patient.

Ugón² reports several cases. A boy, aged eight years, had been coughing for six months, the sputum being profuse and often fetid; following a paroxysm of coughing he brought up an almost complete hydatid membrane. Recovery followed.

In a second case the spasmodic cough and blood streaked sputum were determined by roentgen-ray examination to be due to a hydatid cyst opening into a bronchus. In addition, there was a second cyst which was intact and apparently causing no trouble. This case also recovered following the expulsion of the membrane.

Ugón also refers to the case of an adult who spontaneously expelled the cyst membrane a few hours before an intended operation for its removal.

¹ Japan Medical World, August 15, 1921.

² Revista médica del Uruguay, March, 1921.

Ferro¹ reports 2 cases. In 1, there were three distinct cysts; in the other, the cyst which appeared to be at the base of the lung was above the liver and had pushed the diaphragm upwards 12 cm.

Prat,² of Montevideo has operated on 29 cases of hydatid cyst of one or both lungs, with recovery in all but 2. In the 2 fatalities, death occurred from causes independent of the operation.

Pneumoconiosis. Within recent years there has been a great deal of work devoted to the effects of inhalation of various kinds of dust. Gade³ states that little attention has been paid to wood dust. Under the microscope, the wood particles may be seen to have many sharp edges and points. He believes the inhalation of these particles may set up a catarrhal affection of the respiratory passages, with many disagreeable symptoms and possibly disastrous results.

In addition, some wood-dust contains alkaloids and ethereal oils which may be a factor in the causation of asthma. In regard to the possibility of wood-dust causing pneumoconiosis the chief characteristic of which is a widespread pulmonary fibrosis, I doubt its occurrence. It is now quite generally recognized that inorganic dust does unquestionably cause this change and it is equally certain that organic dust does not do this. In many instances where the trouble is supposed to be due to organic dust, it is found, on analysis, that the dust is mixed and that it is the inorganic material which is the offender.

As to whether organic dust, such as wood fiber, can cause disturbances such as asthma, I believe this is quite possible. I recall Walker, of Boston, relating the details of a case of typical bronchial asthma the cause of which eluded detection for some time. The man was employed in a box factory and exposed to a fine wood dust. On analysis, this contained a protein substance. Inoculation of the man with this protein cured his asthma.

Some of the very best work connected with this subject has come out of the studies of South African observers. In a recent report, Watkins-Pitchford⁴ makes some interesting observations. It has been shown that many men who at the time they joined the colors during the war showing no evidence of silicosis have in the interim passed into what is known as the primary stage. It has always been assumed that, while the evil effects of inorganic dust were progressive so long as the individual was exposed, the process stopped once the inhalation of the dust ceased. This recent observation would seem to indicate that there must exist a preliminary, latent and unrecognizable condition from which silicosis may evolve even though the individual be completely removed from the risk of inhaling silica dust.

Watkins-Pitchford has found that the rigid preliminary examinations to which all applicants are now subjected has resulted in a marked decrease in the occurrence of ordinary pulmonary tuberculosis and no evidence of the development of silicosis.

¹ *Riforma medica*, September 17, 1921.

² *Journal de Chernique*, June, 1921.

³ *Münchener medizinische Wochenschrift*, September 9, 1921.

⁴ Annual Report of the Miners' Phthisis Board (Abstract, *Journal of Industrial Hygiene*, April, 1922.)

It has long been held that coal dust (anthracosis) has a retarding effect on the development of tuberculosis; this adds interest to the statement that no evidence is found that previous work in coal mines had any effect in retarding the development of silicosis. On the other hand, a curious phenomenon is reported; men who had previously been in mines in Cornwall and so exposed to silica dust, when employed in the gold mines of South Africa, actually took longer to develop silicosis than other new men, the mean length of time for the ten miners being eleven years and five months as contrasted with nine years and eight months for men coming from other forms of employment.

Reference is made in the report to an investigation carried out in industries apart from the Reef, in which there is exposure to dust inhalation. This inquiry gives further support to the law that unless the dust in question contains silica, there is but little danger of pulmonary fibrosis developing, or of dust phthisis supervening. The case of the Bon Accord Quarry is of particular interest. Here the dust conditions could hardly be worse, but the rock dealt with, norite, was found to contain no free silica and no definite case of silicosis was brought to light among the men employed.

This statement should be qualified. All forms of inorganic dust, so far as at present known, are capable of producing fibrosis. Silica will produce fibrosis far more rapidly than the others, but, if the exposure is sufficiently long, fibrosis is an inevitable result no matter what form of inorganic dust the worker inhales.

Cooke¹ emphasizes the importance of the inhalation of dust as a causative factor in the production of *asthma*. In a study of 327 cases dust extract was important in 33 per cent of the entire group. A study of the dust in the occupational or domiciliary environment of an asthmatic establishes a positive diagnosis in certain cases not obtainable by any other means. Cooke states these investigations have shown the presence of a substance in most house dusts that is in itself an important factor, although its nature and source are as yet unknown. He also believes that the dust of hay may act as a specific allergen and is not to be considered solely as a simple mechanical irritant.

Syphilis of the Respiratory Tract. Syphilitic disease of the bronchi and trachea is conceded by pathologists; it usually manifests itself by signs of obstruction. At one time pulmonary syphilis was believed to be quite common but, following the discovery of the tubercle bacillus, diagnoses of pulmonary syphilis became infrequent. Within the past few years, more and more cases are being reported. Pathologists almost universally are loath to accept these cases as true examples of syphilis. The clinician, on the other hand, can only point to the fact that the patient had respiratory symptoms and signs, a positive Wassermann and usually other stigmata of syphilis. These disappear promptly under antiluetic treatment.

Personally, I have seen several lungs in which the trouble was syphilitic. One in particular might readily have been mistaken for tuberculosis by an unsuspecting observer. The upper lobe of this lung

¹ Journal of Immunology, March, 1922.

contained many small, caseous-looking areas and at one point one of these had broken down and produced a small cavity. Careful histological examination of this specimen showed no evidence of tuberculosis. The caseous-looking areas were small gummata and, in addition, numerous spirochetes were found in the pulmonary tissue.

For some years we have been interested in this subject at the Phipps Institute. Lewis and myself have reported on several occasions, cases in which a diagnosis other than that of syphilis could not be established.

Our studies showed that these cases present the symptoms, and in many instances the physical signs, usually encountered in pulmonary tuberculosis. Efforts to establish the latter disease as the cause of the illness failed. On the other hand, the Wassermann is positive, there may be a positive history of lues and there may also be other syphilitic stigmata. The diagnosis, therefore, is almost universally made by exclusion. It is to be remembered that lues and tuberculosis frequently coexist. Several years ago a splendid example of this was shown before the Philadelphia Pathological Society by Lucke.

Minton,¹ who is attached to the Phipps Institute Staff, has reported additional cases from that clinic.

Jacobaeus,² in discussing visceral syphilis, points out the difficulties attending a diagnosis of pulmonary syphilis. In one of his cases, with a positive history of lues twenty years before, a febrile pulmonary affection with indications of trouble in one upper lobe and the opposite apex entirely cleared up under specific treatment in the course of a month or so. In this case there were no tubercle bacilli and a negative Wassermann reaction. The diagnosis previously made was chronic pneumonia. It is in such cases that the therapeutic test should be applied; it is not infrequently followed by brilliant results. In another case tuberculosis was supposed to exist with the signs of cavity at one apex. Artificial pneumothorax led to some improvement; later antiluetic treatment was instituted and led to a prompt cure. In this case Jacobaeus believes a gumma had broken down and formed a cavity. A third case showed at necropsy that both tuberculosis and syphilis were present.

Benoit³ emphasizes the close resemblance pulmonary syphilis has to pulmonary tuberculosis. He cites an instructive case. A man, aged sixty-nine years, had been spitting blood for a week. This, and other symptoms, pointed strongly to tuberculosis. He had a strongly positive Wassermann reaction and roentgenogram which suggested an aneurysm of the aorta had there been pulsation. He was placed on specific treatment and promptly recovered.

In 817 tuberculous patients, Carter⁴ reports the presence of syphilis in 77. He states that in those cases with a double infection the effect upon the course of the tuberculosis is beneficial in the majority of cases.

In those cases with the physical signs of advanced lesions showing a positive Wassermann test and absence of tubercle bacilli, marvellous cures have sometimes followed mixed antisyphilitic treatment.

¹ New York Medical Journal, June 1, 1921.

² Finska Läkarsällskapets Handlingar, May-June, 1921 (Abstract, Journal of the American Medical Association).

³ Bulletin de la Société médicale de hôpitaux, May 20, 1921.

⁴ Virginia Medical Monthly, January, 1922.

Egdahl¹ has analyzed 35 cases of pulmonary syphilis. Of this number, 14 were females and 21 males; the ages varied from twelve to sixty-seven years, but 80 per cent were thirty-five years or over. The interval elapsing between the primary infection and the appearance of pulmonary symptoms varied from one to twenty-five years; in the majority the primary infection had occurred ten years previously. In a number, syphilitic stigmata were present (gunma of parietal bone, periostitis, miscarriage, etc.). Included in this report is a personal observation, that of a woman who, in addition to frontal headaches and cough and expectoration, had marked physical signs over the left lung, she made a complete recovery under antiluetic treatment.

A roentgen-ray study of pulmonary syphilis has been contributed by Floyd, Boutwell and Leonard.² They state that a routine Wassermann test at the Boston Consumptive Hospital has shown that 8 per cent of the male patients have syphilis. Fifty of these have been subjected to both physical and roentgen-ray examinations over a period of years, during which time they encountered 2 cases which were fairly typical of pulmonary syphilis; in several others with tuberculosis, the lung lesions receded under specific treatment, suggesting a dual infection. They allude to Dunham's observation that when clinical signs are demonstrated and the roentgen ray is negative, it is strongly suggestive of lues. Several of these cases presented this feature. Figs 1 and 2 reproduced from their article shows the disappearance of a syphilitic lesion in the right middle lobe. A similar observation was made at the Phipps Institute. The latter case has now been under observation for four years. In the older literature on pulmonary syphilis reference is frequently made to the right middle lobe as the site of syphilitic disease.

Watkins³ in a roentgen-ray study of the appearance of the lungs in syphilis believes that the condition can be distinguished from tuberculosis by reason of the fact that the latter spreads along the lymphatics and the former by way of the arteries. A consideration of the relations of the arteries and lymphatics to the pulmonary subdivisions should, therefore, be kept in mind. He believes that inasmuch as the shadow of tuberculosis is definitely established, the differentiation would be between syphilis and other less common types of lung disease. This latter statement would hardly meet the approval of many roentgenologists who hold that, in the early stages, at least, there is nothing in the roentgen-ray shadows that points to tuberculosis conclusively.

In a clinical and anatomical study of *fibrosis of the lungs* Gastinal and Jacob⁴ state that syphilis alone is able to realize the clinical picture of any and every form of sclerosis, although the form suggesting pneumonia is rare. The most common form is that associated with dilatation of the bronchi which has lead some to assert that syphilis is responsible for *bronchiectasis* in practically every case. (This is entirely too extreme a view.) The symptoms from the lungs may be dominated by those from

¹ Military Surgeon, February, 1922.

² Archives of Internal Medicine, September, 1921.

³ American Journal of Roentgenology, May, 1921.

⁴ Bulletin médical, November 12, 1921.

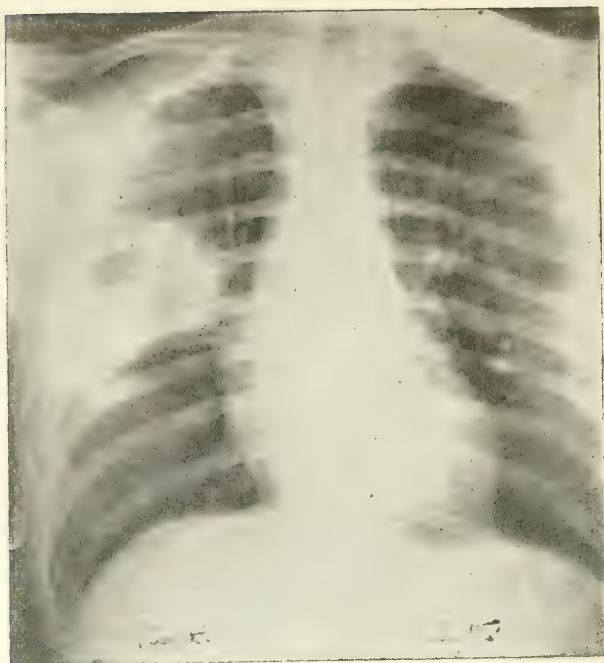


FIG. 1

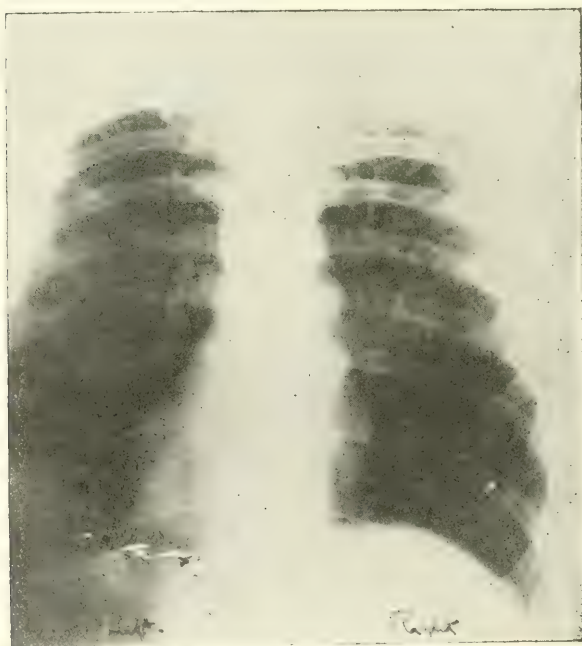


FIG. 2

FIGS. 1 AND 2.—X-RAY PICTURES OF A PATIENT WITH A POSITIVE WASSERMANN TEST TREATED FOR SYPHILIS. (Floyd, Boutwell and Leonard).

FIG. 1.—April, 1917, showing a circumscribed area of infiltration in the right middle lobe spread out in fanshape fashion from the root of the right lung.

FIG. 2.—April, 1920. Shadow in right middle lobe has entirely disappeared. Heart and lungs negative.

a bronchial stenosis. What they term the triad in children with inherited syphilis consists of apical sclerosis, enlarged lymph nodes at the hilum and emphysema at the base, with no tubercle bacilli. They noted this combination in 18 cases, and in 13 of them the Wassermann reaction was positive. In these cases with fibrosis asthmatic-like symptoms may occur.

Balzer¹ states that *inherited syphilitic* disease of the lung may develop early or not until maturity; cases have been published at the ages of twenty-one, twenty-eight, thirty-four and even forty-one. The cough and dyspnea are usually nocturnal, and there may be hemoptyses and night sweats. Bronchiectasis may develop in time. He thinks that syphilis should be suspected in all cases of bronchopneumonia tending to chronicity and sclerosis after measles, influenza and whooping cough. The lesions predominate in the central and lower portions of the lung and are usually unilateral. As a rule the general health remains fairly good. He quotes Muriac who states that the treatment of pulmonary syphilitic lesions is apt to be more successful than with visceral lesions. The arsenicals are particularly effectual in syphilitic bronchitis simulating pulmonary tuberculosis. This is also borne out by our experience at the Phipps Institute. Many of the cases with apparent pulmonary lues have cleared up very quickly.

When syphilis and tuberculosis coexist, antisiphilitic treatment should be carried out. At the Phipps Institute we have pursued the following plan: The initial dose of arsphenamine is half that usually given. If no untoward effect is noted, insofar as the tuberculosis is concerned, the treatment is continued as in the uncomplicated case. Floyd, Boutwell and Leonard² advise that every case having tuberculosis and syphilis combined should be given intensive syphilitic treatment, more especially if the lesion is not typically one of tuberculosis. Benoit³ also points out the necessity of relieving the syphilitic condition if the tuberculous process is to be benefited.

The case reported by Hollander and Narr⁴ sounds a note of warning in handling these cases. A negro with ulcerating gummata involving the neck was given arsphenamine, mercury and the iodides. He improved greatly, but later developed ascites. Later he died, and at the autopsy a generalized miliary tuberculosis was found. The authors believe that the iodide treatment was in part responsible for the patient's loss of resistance and development of miliary tuberculosis. It must be borne in mind that tuberculous lesions, especially the pulmonary form, may break down under the use of iodide of potassium.

Three cases of *syphilis of the trachea and bronchi* are reported by Stimson.⁵ In the first case the principal symptom was a paroxysmal cough of three and a half months' duration; there were, in addition, dyspnea and cyanosis. Wassermann test was positive. Some relief was obtained with antiluetic treatment but the patient died of lobar pneumonia. At the autopsy, the left bronchus was found partially

¹ Paris médicale, January 21, 1922.

² Loc. cit.

³ Loc. cit.

⁴ Archives of Dermatology and Syphilology, August, 1921.

⁵ American Journal of the Medical Sciences, May, 1921.

obstructed by a gummatous lymph node; there were, in addition, stenosis of the left pulmonary artery, lobar pneumonia and syphilis.

In the second case, violent paroxysms of coughing had existed for three years. The cough was barking in character, associated with stupor and dyspnea which made sleeping horizontally difficult. Asthmatic rales were heard in both lungs. The Wassermann test was positive. Catarrhal laryngitis and a papule in the lower part of the trachea were present. The trouble was relieved by antiluetic treatment.

In the third case the diagnosis was syphilis of the right bronchus. The history was that of bronchitis of one year's duration, characterized by a severe paroxysmal cough, much sputum, dyspnea, both inspiratory and expiratory, and loss of weight. On physical examination there were marked contractions of the accessory muscles of inspiration, stridor, and an inspiratory thrill over the larynx, trachea, and left chest. The breath sounds were louder over the left side than the right. The Wassermann test was positive. The patient died thirty-six hours after admission to the hospital. No autopsy was done.

Pulmonary Abscess. In 1912, Richardson called attention to the occurrence of pulmonary abscess following tonsillectomy. Since that time this accident has been noted with alarming frequency.

At the present time there is much discussion as to how the abscess develops, whether as the result of the inhalation of infected material or as the result of infected emboli. When these abscesses were first noted, it was the general assumption that the inhalation of cheesy material from the diseased tonsil was the cause. Furthermore, it was believed that the form of anesthesia had some influence. Thus local anesthesia was thought to be safer than a general anesthetic such as ether.

Fisher and Cohen,¹ in reporting several personal observations, express the belief that there is a relationship between the use of a general anesthetic and pulmonary abscess following tonsillectomy. They therefore recommend local anesthesia for the following reasons:

1. It removes the possibility of aspirating infective material.
2. It produces a marked constriction of the lymph and the blood channels in the field of operation, thus preventing the introduction into the circulation of infective emboli.
3. It reduces general shock, and the general ill effects which always ensue to a greater or less degree after general anesthesia, particularly ether.
4. It cannot possibly light up a quiescent lesion anywhere in the respiratory tract. We deem tonsillectomy in the adult safest when done under local anesthesia.

Clendening² takes issue with the statement that these abscesses are embolic in origin. It is his belief that all single abscesses are due to the inhalation of infective material. Several factors may be responsible for this, namely—abolition of the swallowing reflex by ether, the position of the patient, pressure from in front by a motor-driven apparatus and a prepared lung soil.

¹ Journal of the American Medical Association, October 22, 1921.

² Ibid., November 21, 1921.

As to the embolic origin, Clendening doubts this in the case of single abscesses, but grants it in the cases of multiple abscesses.

W. H. Lewis¹ reports on 569 tonsillectomies done in the hospital with which he is associated between January 1, 1920, and November 15, 1921. The great majority of these operations were done by one operator. All patients were given ether anesthesia, the so-called forced method being used during the actual operation. The position was that of recumbency on the back. All the tonsils were completely enucleated and not clipped. Four of the 569 (0.7 per cent) developed an abscess and all eventually recovered.

In Lewis' opinion, forced ether anesthesia is, apparently, insignificant, as the tube extends just inside the lips and does not even approach the pharynx, while the current which comes through is not sufficient to blow feathers about on the table. Lewis concludes that while there may be something in the factor of aspiration of débris, it seems that there is equal force and perhaps more logic to the metastatic hypothesis.

In considering the increasing frequency of this accident in the past decade, the question arises—why was it not noted before? This is to be answered, in all probability, by the statement that formerly tonsils were, for the most part, simply clipped off. Now that complete enucleation is generally practised more trauma is inflicted, and, as a result, infected emboli are squeezed into the bloodvessels. For those who hold the type of anesthetic responsible, it is well to remember that quite a large proportion of cases have followed local anesthesia.

Until very recently there were three procedures available in the treatment of pulmonary abscess: (1) If the drainage was efficient, as shown by the gradual diminution of the sputum, the subsidence of constitutional symptoms and a clearing up of the physical signs the case was allowed to go on to spontaneous cure; (2) if the natural drainage, however, is ineffective, interference is usually indicated. Either the lung may be collapsed by means of sterile air or nitrogen gas and the abscess compressed, or (3) a thoracotomy and drainage of the abscess should be done. Both of these procedures have given excellent results.

Recently, it has been recommended that the abscesses be treated directly through the bronchoscope. Lynak² has recently written on this method which, in his hands, has proved most efficient. It may be that as the bronchoscope comes into more general use, plus the requisite skill to efficiently handle it, this direct method of treatment will be more generally applicable.

In quite a number of cases which have come under my observation, thoracotomy and drainage have proved most satisfactory. There has been no mortality in these cases. I have also had several cases in which collapse of the lungs proved most effective.

Netter³ has reported a case of multiple abscesses of the lung following pneumonia which cleared up under the use of antipneumococcus serum. In all 710 cc of the serum were injected and the patient made a complete recovery in two months.

¹ Journal of the American Medical Association, December 17, 1921.

² Ibid., November 12, 1921. ³ Archives de médecine des enfants, July, 1921.

Apart from direct trauma, Schwyzer¹ believes that *purulent infections of the anterior mediastium* are, for the most part, due to the breaking down of lymph nodes or to the advance of an abscess which started in the neighborhood. Of 2 cases observed by him, 1 was an abscess along the pericardium on the right side. It originated from a tuberculous condition of the fourth, fifth and sixth ribs. The second case was a lymph-node abscess, taking its origin from what seemed to be one of the right tracheobronchial lymph nodes.

Hypertrophic Pulmonary Osteoarthropathy. This curious change in the ends of the fingers and the long bones is most commonly associated with chronic respiratory disorders. It is so frequently associated with *bronchiectasis* as to be of diagnostic value. It is really an advanced stage of ordinary *clubbing of the fingers*. To clubbing of the fingers is added proliferative changes in the bones, usually the long bones of the arms and legs. Hypertrophic pulmonary osteoarthropathy also occurs in cases of pulmonary abscess, empyema, hypertrophic cirrhosis of the liver, metastasis to the lungs in malignant disease, and occasionally there is no obvious cause.

Weinberger² reports an extreme case in which the change in the bones was an early symptom of a cancer originating in a bronchus. It is the third case of the kind on record. Weinberger ascribes the changes to toxic action from the tumor. Toxic absorption from the stagnating secretion in the bronchiectatic cavities is commonly given as the cause of hypertrophic pulmonary osteoarthropathy. The trouble with such explanations is that they do not cover those cases in which there is no such cause. One should always bear in mind that clubbing of the fingers is usually indicative of some chronic pulmonary trouble; it may, however, develop rapidly in cases of pulmonary abscess or empyema.

Asynchronism of the Respiratory Movements in Lobar Pneumonia. Several years ago Warren Coleman³ called attention to a type of breathing in lobar pneumonia not previously noted. In a second communication⁴ he again describes the phenomena as follows:

Briefly, this type of breathing is characterized by a separation at the moment of contraction of the diaphragm and intercostal (and other thoracic) muscles by a definite though variable time interval. The diaphragm contracts first, the abdomen protrudes, and then, after varying intervals contractions of the intercostal muscles follow. The lowermost intercostals may contract first and the movement of the thorax progress like a wave from below upward, or the delay in the contraction of the intercostals may result in complete asynchronism. In the fully developed type of asynchronism the diaphragm reaches the expiratory phase before the contractions of the intercostals set in, and the abdomen and chest rise and fall alternately—"seesaw" best describes the impression conveyed.

The time relations of the contractions of the diaphragm and inter-

¹ Annals of Surgery, 1922.

² Wiener Archiv für innere Medizin, June 30, 1921.

³ Journal of the American Medical Association, December 27, 1919.

⁴ Ibid., January 7, 1922.

costal muscles with those of the auxiliary and associated muscles of respiration (for example, of the *alæ nasi*) have not been determined in detail, but dilatation of the *alæ nasi* has been observed to precede the bulging of the abdomen which, in turn, preceded the movement of the thorax.

The cause of the delay in the contractions of the intercostal (and other thoracic) muscles is not entirely clear, but it was suggested that it might be found in unequal depression of the bulbar (*formatio reticularis*) or other centers by the pneumococcus toxin.

The prognostic significance of the phenomenon is grave. The fully developed types of asynchronism (that is, complete dissociation of the contractions of the diaphragm and thoracic muscles) occurs only, at least in my experience, in severe and usually fatal cases of lobar pneumonia.

Recurrent Lobar Pneumonia. It is well known that one attack of pneumonia does not confer an immunity against future attacks. Instances are on record in which the same individual had suffered from half a dozen or more recurrences.

Thompson¹ reports a case in which lobar pneumonia occurred in a robust man in three successive years, during which there was no influenza. The interval between the first and second attacks was eighteen months, and between the second and third attacks—thirteen months. All were characterized with chill, pain in the chest, cyanosis, rusty sputum, dyspnea and leukocytosis ranging from 19,000 to 25,000. Crisis occurred on the sixth day in the first attack; on the fifth day in the second attack; and in the third attack the temperature subsided to normal by lysis from eighth to the tenth day.

The left lower lobe was involved in the first two attacks, and the right lower lobe in the third attack.

In the second case there was an interval of eleven months between the attacks. Crisis occurred on the fifth day in the first attack and on the eighth day in the second.

A year ago I had under my care a woman with well-marked tuberculosis involving the apices of both lungs. She had been fever-free for three months. She was seized suddenly with an acute illness, which proved to be a lobar pneumonia involving the left lower lobe. The attack lasted ten days, the temperature falling by lysis. After an interval of three weeks, during which her temperature was normal, there was a repetition of the former illness. This time the right lower lobe was the site of the trouble. This attack also lasted ten days, the temperature falling by lysis.

Aside from a little loss of weight, she was apparently none the worse. The tuberculosis lesions did not become active.

Unresolved Pneumonia. There has always been a good deal of confusion on this subject. In any discussion of pneumonia, unresolved pneumonia has always figured largely as a sequel. The epidemic of influenza in 1918-1919 has more or less focussed attention on this ending of a pneumonia process.

¹ New York Medical Journal, March 1, 1922.

Piersol,¹ in considering the subject, points out that there are two groups of cases in which the question of unresolved pneumonia must be considered. The first group embraces the true instances of unresolved pneumonia and are encountered almost exclusively in bronchopneumonias of lobar distribution. The second group includes those instances of so-called unresolved pneumonia, but which in reality prove to be some graver complication.

In the first group, Piersol describes the clinical picture as follows: An individual suffers from a pneumonia. Definite clinical improvement occurs, the constitutional symptoms notably the fever, subside; but, in spite of this symptomatic improvement, physical signs suggestive of some consolidation persist at the side of the original lesion. This type of case is encountered chiefly as a sequel of lobular pneumonia and was particularly noticeable after the epidemic of influenza.

It is to be remarked that not infrequently such unresolved pneumonias are observed in those whose original pulmonary infection is characterized by such slight clinical manifestations that it is at first not recognized as a bronchopneumonia. Piersol emphasizes the fact that inasmuch as the symptoms of delayed resolution or unresolved pneumonia are frequently variable, slight or entirely wanting, the diagnosis of the condition rests largely on the physical examination. This reveals at some area of former consolidation limitation of expansion, some increase in tactile fremitus, impaired resonance to dullness on percussion; as a rule, feeble breath although at times the breath sounds may be harsh and broncho-vesicular, some alteration in the spoken voice and crackling rales. The impaired percussion note and the rales, are perhaps the most constant physical signs persisting in these cases, as an associated pleural thickening may obscure and modify the other phenomena. For weeks or even months, these physical signs of residual infiltration may persist, with the signs varying somewhat from time to time.

These areas of unresolved pneumonia are found but seldom at the apices, the site of election being the bases or about the angle of the scapula. If the process does not end in a pulmonary fibrosis and an associated bronchiectasis, these signs gradually clear up and the lungs sound normal.

In regard to the roentgen ray as an aid in the diagnosis, it is to be borne in mind that the picture is chiefly that of a bronchitis and peribronchitis. The roentgen ray is of service in these cases principally because it rules out the more serious complications which are so frequently mistaken for unresolved pneumonia. Piersol quotes Boggs that it is a mistake to regard the roentgen-ray examination as conclusive. The diagnosis should rest on a consideration of the roentgen-ray findings, clinical observations and physical examination.

Acute Pulmonary Edema. The exact cause of this condition is not clear. It is characterized by a sudden onset. The patient coughs, frequently bringing up mouthfuls of frothy, blood-tinged fluid. During the attack, a quart or more of this liquid may be expectorated. Exami-

¹ Pennsylvania Medical Journal, 1921.

nation of the chest reveals that both lungs are filled with crepitant and subcrepitant rales to such an extent that the respiratory murmur is obscured. Corbin¹ reports the case of a young woman, aged twenty-four, who ten minutes after the birth of a child developed acute pulmonary edema. Ten minutes after the onset of the dyspnea she began to cough at short intervals and with each coughing attack brought up a mouthful of frothy, bloody liquid. At the end of an hour she had expectorated more than a liter. This expectoration was at first decidedly bloody, later it was rose colored and finally clear.

Corbin hazards the opinion that the edema in this case was due to cramp or spasm of one of the heart cavities.

Primary Carcinoma of the Lungs. Carcinoma of the lungs secondary to a focus elsewhere in the body is not infrequent. Such an occurrence is always to be suspected in an individual who has a malignant growth or one from whom such a tumor has been removed. Primary carcinoma of the lungs, on the other hand, is relatively uncommon, and the diagnosis may for a time be uncertain or indeed never made. Moise,² in reporting 5 cases, gives an excellent review of the subject. He states that clinically primary growths may be divided into four groups: (1) Small solitary tumors producing no clinical symptoms; (2) tumors in which the dominant symptoms are produced by cerebral or other metastases; (3) those in which the patient is first seen in a moribund condition and (4) those showing symptoms and signs of more or less extensive pulmonary involvement with or without metastases.

Moise states that inasmuch as the majority of cases are seen in a late stage, a satisfactory classification, either on a basis of gross pathological or histological structure, is difficult and unsatisfactory. While it is true that there are several morphologically definite types, such as mucus secreting adenocarcinomas, and pricked-cell tumors, the majority of cases do not fall into well-defined groups, but present striking variations in structure in different parts of a single tumor.

Moise believes that while the exact origin of these tumors is difficult to determine, both the gross and microscopical evidence points strongly to a bronchial origin for most of them. His 5 cases, he thinks, certainly originated either in the bronchial mucosa itself or in its glands.

Composite statistics compiled prior to 1917 indicate that carcinoma of the lungs was found in approximately 0.36 per cent of necropsies and 1 per cent of all carcinomas. Moise's 5 cases occurred in the service of the New Haven Hospital among 375 necropsies and represented 1.38 per cent of all necropsies and 17 per cent of carcinomas. These figures, Moise believes, are suggestive of an increase in the incidence of pulmonary cancer. He furthermore states that the lungs, in fatal cases of influenza occurring in the recent epidemic, showed very regularly severe damage to the bronchial and alveolar epithelium, often associated with striking and atypical epithelial proliferative changes resembling early carcinomas. Such lesions, he thinks, suggest the possibility of a causal relation between influenzal infection and the recent apparent increase in carcinoma of the lungs, as indicated by the figures given above.

¹ Surgery, Gynecology and Obstetrics, April, 1922.

² Archives of Internal Medicine, December, 1921.

The incidence of cancer in certain occupations in which the worker is subjected to chemical irritants or various types of inorganic dust is the subject of an editorial article.¹ The irritant effects of the aniline dyes and the effect of arsenic in stimulating epithelial growth has been discussed a good deal in recent years by reason of the occurrence of carcinoma of the urinary bladder in men who are engaged in the manufacture or use of anilin dyes.

For many years it has been known that the workers in the cobalt mines of Saxony have been extremely prone to develop cancer of the lungs. This has been recognized for many years, but whether it is epidemic or whether it is due to the inhalation of much dust laden with arsenic, cobalt, and perhaps other poisonous elements, is not clear. Uhlig² states that in the Schneeberg district it is common to find men, still in the prime of life, condemned to light and unremunerative work because of pulmonary disease—the result of work in the mines. They usually end their lives with a diagnosis of “bergfertig,” which means nothing more nor less than cancer of the lungs.

At one time the incidence of this form of lung cancer was from 10 to 16 cases a year among a force of about 600 miners, but the number has been reduced to about 1 in 200 miners.

The editorial article referred to calls attention to the fact that arsenic-containing ores are mined in other places than Schneeberg, but we do not hear of lung cancer among the miners. The question arises: Is the disease being overlooked in these places? We have referred to Moise's suggestion that pulmonary cancer is on the increase and the impression seems to be that such is the case. As the editorial suggests, the increase may be the result of more postmortem examinations and it might be added the more general use of the roentgen rays.

The editorial article further suggests that the increased amount of *pneumoconiosis* in city and industrial life may be a factor. Schmorl is quoted as stating that lung cancer is relatively frequent in Dresden, attributing it to the number of sandstone industries in this vicinity. While the inhalation of inorganic dust, if sufficiently prolonged, does unquestionably lead to extensive fibroid changes in the lungs, it is doubtful whether it has any influence on the incidence of pulmonary cancer, as the editorial article suggests. Pancoast and myself have, for the past five years, devoted a great deal of time and study to the effects of dust, particularly the inorganic form. So far, we have never encountered a malignant case. The extensive studies of South African observers on *silicosis* has never revealed, so far as I know, a case of pulmonary cancer, which could be attributed to this type of dust which is the most irritant of all forms of inorganic material. In a fairly large experience with potters, all of whom develop *pneumoconiosis* and many of them tuberculosis in addition, I have never encountered a malignant case.

Sarcoma of the lung is much more rare than carcinoma. It is usually a rapid growing tumor and the duration of life from the time it first

¹ Journal of the American Medical Association, December 31, 1921.

² Virchows Archiv für pathologische Anatomie, 1921, 230, 76.

manifests itself is relatively brief. A case reported by Pritchard¹ is of interest because of its similarity to many cases of pulmonary tuberculosis, its long duration and lack of physical deficiency such as loss of weight and strength. The first symptoms were cough, blood-streaked sputum, an afternoon temperature of 100° or 101° F., and a rapid pulse. Physical examination at this time was negative. Nineteen months later physical examination revealed moist rales over the front and back of the right hilum. Fluoroscopy showed an enlarged right-root shadow and the roentgenogram a small, clear-cut, rounded shadow in the upper part of the right hilum. The patient was put on absolute rest, and in about four weeks the symptoms all disappeared. The patient resumed her duties as a pupil nurse and worked without interruption for nearly ten months. During this time she had no symptoms other than a slight, unproductive cough. The symptoms again recurred and again disappeared after ten days' rest in bed. Examination several months later showed that the lesion had increased tremendously, occupying most of the right side of the thorax, except the apex and costophrenic angle. Still no diagnosis was made. Operation was advised and a tumor weighing 800 gm. was removed. This was found to communicate with a bronchus and the occasional opening of this probably accounted for the periodical recurrence of the respiratory symptoms.

Substernal Goiter. In patients exhibiting the symptoms and signs of intrathoracic pressure, it should be borne in mind that a substernal or intrathoracic goiter may be the cause. Pemberton reports that of 4006 patients thyroidectomized in the Mayo Clinic, 542 (13.5 per cent) were found to have glands situated substernally and 25 (0.6 per cent) of them were classified as intrathoracic. Tracheal deformity was noted in 30 per cent; and dilated veins in the neck and over the chest in 10.7 per cent. Although hoarseness was complained of by only 29 patients, 45 showed paralysis of one or both vocal cords.

In those cases in which the gland is entirely intrathoracic and not visible, the presence of pressure signs should lead to a search for signs of hyperthyroidism. Although slight, they may, if present, be sufficient to give one the correct clue.

THE DIAPHRAGM.

Postdiphtheritic Diaphragmatic Paralysis. In view of the important role played by the diaphragm in the performance of the respiratory function, it is surprising how little space is devoted to the various conditions which may affect it. Mixsell and Giddings³ have contributed an interesting article on Postdiphtheritic Diaphragmatic Paralysis. They report 8 instances of this condition in 4259 cases of diphtheria. For a proper understanding of the condition, it is necessary to recall the anatomy of the phrenic nerves. These nerves arise chiefly from the fourth cervical nerve, with a few filaments from the third, and a communicating branch from the fifth

¹ American Journal of Roentgenology, October, 1921.

² Archives of Surgery, 1921, 2, 1.

³ Journal of the American Medical Association, August 21, 1921.

cervical nerve. They descend to the root of the neck, enter the chest, and descend nearly vertically in front of the root of the lung and by the side of the pericardium, between them and the mediastinal portion of the pleura, to the diaphragm, when they divide into branches, some of which are distributed to the thoracic surface, but most of which separately pierce the diaphragm and are distributed to the under surface. Each nerve supplies filaments to the diaphragm, pericardium and pleura. Branches have been described as passing to the peritoneum. From the right nerve one or two filaments pass, to join in a small ganglion with phrenic nerve branches of the solar plexus; and branches from this ganglion are distributed to the hepatic plexus, the suprarenal capsule and the inferior vena cava. As Mixsell and Giddings point out involvement of this nerve is capable of producing serious trouble with the respiratory function, especially if both leaflets are paralyzed. In the latter instance, breathing soon become impossible, and death within three or four days results. In diphtheria, the paralysis of the phrenic nerves is due to a toxic peripheral neuritis. It is a parenchymatous degeneration of the myelin sheath of the nerves and this degeneration affects both motor and sensory fibers alike.

The 8 cases reported by Mixsell and Giddings were children. The average time of discharge from the hospital was three weeks. They point out that the number of cases might be larger as generalized paralysis, including paralysis of the diaphragm, develops between the fifth and seventh weeks. Some cases believed to have broncho- or lobar pneumonia as a late sequel of the diphtheria might in reality be instances of paralysis of the diaphragm as generalized paralysis, including paralysis of the diaphragm which do not develop until five to seven weeks after the primary attack.

Mixsell and Giddings describe the symptoms prior to paralysis of the diaphragm as follows: Both limbs as a rule are drawn up; both thighs are flexed and pressed against the abdomen. Respiration is carried on by the voluntary upraising of the shoulders for each respiration, and each effort is accompanied by the contractions of the intercostal muscle. The entire breathing is intercostal in character, and is markedly dyspneic. There is also a well-defined contraction of the diaphragm and a tendency to scaphoid abdomen. As a rule, diaphragmatic paralysis is preceded by vomiting, tachycardia, dyspnea and a weak, irregular pulse. The patient is restless, there is a dry cough due to palatine paralysis and difficulty in swallowing. The expression is anxious, and the color may be pale or cyanotic. Epigastric pain may be present.

With complete paralysis of the diaphragm the abdominal respiratory movements are reversed.

Treatment is entirely symptomatic and the result is practically always fatal.

Rosenow¹ believes that there is a relationship between *epidemic hiccough* and epidemic encephalitis. In 3 cases of epidemic hiccough he obtained pus from the tonsils. Cultures made from this material were

¹ Journal of the American Medical Association, June 18, 1921.

injected intracerebrally into rabbits and monkeys. After a period of incubation lasting from one to seven days, depending largely on the size of the dose and the virulence of the strain, a remarkable train of symptoms developed, in which rhythmic clonic spasms of the diaphragm were the striking feature. These spasms varied greatly in severity and duration. In some animals the spasms were mild and were noted for short periods at one or more intervals only, and recovery was the rule. In others, they were intense, associated with hiccough, and continued with little interruption for many hours, often to the point of complete exhaustion of the animals. The spasms were temporarily controlled by the administration of ether; they were controlled for some hours by depressants of the respiratory center, such as heroin and morphine, and for short intervals by uniform, quiet pressure around the abdomen at the level of the diaphragm. All the animals in which the spasms became marked died. The organism producing this condition was a streptococcus. Occasionally the diaphragm is subject to clonic contractions. Such a case has been reported by Bersani¹ under the title of *tic of the diaphragm*. His patient, a man, aged fifty-one years, suffered from rhythmic clonic contractions of the diaphragm up to 120 per minute. There was no hiccough. The attacks occurred irregularly, sometimes after emotional distress and the man was able to accentuate or inhibit them at will. They did not occur during sleep. He quotes a case reported by Remak in which clonic contractions occurred 48 to 54 times per minute and violent enough to shake the trunk. Bersani states that Salta has observed five cases in which the phenomena was continuous even during sleep. Remak's case was relieved by the application of galvanic electricity to the back of the neck and the back.

A year ago I saw a remarkable case with Dr. Gordon Saxon. A young woman had suffered for nearly a year with spasm of the diaphragm associated with hiccough. The spasm occurred about once a minute. It was partially controlled by morphine. This began to be a serious matter owing to the necessity of increasing the dose. She was finally cured by resection of one of the phrenic nerves. In this case it was almost incredible that the patient could have survived the annoyance of this condition for so long a time.

Kovács² urges surgical treatment for cases of *subphrenic abscess* as soon as the diagnosis is assured. Operative results are excellent, while the percentage of cures is small if an expectant plan of treatment is pursued.

When a subphrenic abscess occurs on the left side it commonly contains gas. The condition was referred to by Leyden as subphrenic pneumothorax. A perforated gastric ulcer is the origin of many of these cases. Shottmüller³ believes that perforation of a gastric ulcer with escape of the gastric contents into the subphrenic space, is more common than usually believed, without the formation of an abscess. In 2 of 3 cases which he reports the suppuration occurred, but only what he

¹ Policlinico, November 21, 1921.

² Wiener klinische Wochenschrift, July 14, 1921.

³ Deutsche medizinische Wochenschrift, August 4, 1921.

terms a *subphrenic pneumothorax*, which disappeared in a few days. He expresses the belief that the extensive adhesions that are so often encountered in operations for gastric ulcer, between the liver, colon, omentum and stomach are certainly due to a perforated ulcer. Possibly abscess formation is prevented by the germicidal action of the gastric juice.

In discussing *diaphragmatic hernia*, Truesdale¹ divides them into traumatic and congenital. The former results from crushing accidents, such as the passing of a wheel over the upper abdomen, gunshot wounds, stab wounds, etc. Stab wounds are not infrequent and usually occur on the left side as a right handed man in attacking his opponent can most readily reach the left side. Furthermore, in wounds on the right side, the liver acts as a plug.

The congenital form is relatively common—much more so now that the roentgen ray has come into use so generally.

In the acquired or traumatic form death may result quickly from shock. If the patient survives, dyspnea and gastro-intestinal disturbances usually occur at irregular intervals. The disturbance may be very slight or it may take the form of nausea, vomiting, obstipation, dyspnea and cyanosis.

I have seen one case following a crushing accident in which the roentgen ray gave the first intimation that the stomach, and portions of the intestines had passed through a slit in the diaphragm into the left thoracic cavity.

In the congenital form, the condition may persist for years and only reveal itself as the result of an examination for other purposes. Occasionally these cases after exertion or overeating will suffer from a feeling of oppression. In other instances, attacks of dyspnea occur at irregular intervals as the result of gaseous distention of the stomach and intestines.

The physical signs vary considerably and unless one has in mind the possibility of a diaphragmatic hernia the chest signs are usually misinterpreted. Inasmuch as the hernia is almost invariably on the left side the signs will vary greatly accordingly as the stomach is empty, distended with gas or contains food.

The affected side is usually somewhat distended and expansion is absent. The costal margin on the affected side flares out because the pull of the diaphragm against the intercostal and scalene muscles is absent. The heart is displaced. The percussion note will vary according to the condition of the stomach; the note in most instances, however, is tympanitic and this often leads to the mistaken diagnosis of pneumothorax.

On auscultation, the sounds also vary. They are commonly of a mumbling, gurgling character, such as are heard over the intestines.

The fact that one has a large area of tympany which is at times replaced by a dull note, or is subject to change with alteration of the position of the patient and the gurgling, mumbling sounds heard high up in the chest should always suggest the possibility of a diaphragmatic hernia.

¹ Journal of the American Medical Association, September, 1921.

If there has been a crushing accident, or a wound in the upper abdomen, the diagnosis is reasonably easy. It is the congenital case which offers the greatest difficulty. Fortunately the roentgen ray has made the diagnosis easy if only the suspicion occurs that such a condition may be present.

The case reported by Dodgson¹ illustrates an error in diagnosis. In this case the death certificate was made out as death due to pneumonia. Dodgson found that half the stomach, a considerable portion of the transverse and descending colon, as well as coils of the small intestines had passed through a large circular aperture of the diaphragm into the left pleural cavity. The left lung was small, shrunk, and collapsed and situated posterior to coils of colon and the small intestines. The dull note at the left base by the atelectatic lung was the probable cause of the error.

Eventration of the diaphragm may at times simulate a hernia. The physical signs may be much the same.

In cases of eventration the diaphragm is intact; it is simply a condition in which the leaflet is placed abnormally high so that the abdominal contents are correspondingly at a higher level than normal. Eventration, with few exceptions, has always been noted on the right side. The roentgen ray readily differentiates between hernia and eventration. In the latter the line of the diaphragm is unbroken while in hernia it is irregular.

¹ Practitioner, September, 1921.

DERMATOLOGY AND SYPHILIS.

By JAY F. SCHAMBERG, M.D.

The Endocrines in Dermatology. THE TREATMENT OF PSORIASIS BY RADIATING THE THYMUS GLAND. Endocrine disturbance as a cause of cutaneous diseases is receiving from time to time the attention of dermatologists.

Brock¹ records some interesting observations in his clinic at Kiel. He noted that radiation for psoriasis ($\frac{1}{3}$ H. E. D.) in children at times caused aggravation of the condition when the upper part of the chest and neck lay within the radius of the rays. The treatment of adults gave good results. The author then tested the glands and organs which might be responsible, and found that most probably the thyroid, parathyroid, bone-marrow, and the endocrine function of large skin-surfaces are not implicated, but that (a) the function of the thymus is decisive; (b) stimulatory dosage is the essential principle; (c) minimal doses of roentgen rays may bring about cure. He used a cone of light which covered an area between the cricoid cartilage above and the posterior surfaces of the sternoclavicular articulations below. Focal axis; lower edge of jugular fossa. Very soon after roentgen-ray treatment, however, dissemination occurred at the margins of the pigmentation around the psoriasis patch. These could not be rayed under eight weeks without endangering the gland. Better results were obtained in over 50 per cent of cases where the author gave one-fourth to one-third epilation dosage.

As an explanation for the action of this method of treatment, Brock asserts that psoriasis is associated with hypofunction of the thymus, which can temporarily be overcome by stimulation with roentgen rays. This presupposes the existence of functioning thymus tissue at all ages and the possibility of influencing it by means of roentgen rays. In support of his belief, Brock cites the rarity of the disease in early childhood when the thymus is at the height of its activity; its nonoccurrence in status thymus lymphaticus and in true thymus hyperplasia; the aggravation of the disease during pregnancy and lactation when the thymus undergoes involution and presumably decrease in function; and the frequent development of psoriasis during puberty, when involution of the thymus occurs.

The theory recently advanced by Samberger, of Prague, that psoriasis is a parakeratotic diathesis reacting to external irritants with a defect in keratinization, finds a supporter in Brock. Samberger claims that the parakeratotic diathesis is a dyscrasia of the epithelial cells destined for keratinization, and Brock believes these can be influenced toward a

¹ Deutsch. med. Wehnschr., 1921, 47, 1420.

normal process of keratinization by means of stimulating doses of roentgen rays applied to the thymus.

Heretofore irradiation of glandular structures has been done to secure a destructive effect and for the purpose of diminishing secretion in organs in a state of hyperactivity. Stimulation of glandular structures in a condition of hypofunction is a new procedure. Stephan¹ has irradiated the spleen in a severe purpura in a patient with cervical tuberculous adenitis, and observed a marked, though transitory, effect on the coagulation time. Others have undertaken researches on organ stimulation (kidney, pancreas, spleen) in problems connected with internal medicine. In this regard, Petersen and Saelhof² state "that it is probable that the indications of roentgen-ray therapy in the treatment of internal diseases will find marked extension if proper recognition is given the possibility of organ stimulation by such physical means." This statement applies with equal force to dermatology.

This method of treating psoriasis, as advocated by Brock, was studied by Foerster and Foerster.³ The following factors were adopted; 8½ inch spark gap, 10-inch focus skin distance, 3 mm. of aluminum filter, 5 milliamperes, one-half epilation dose obtained in two minutes, forty-two seconds. This equals 1 skin unit according to the MacKee and Remer scale. Coolidge tube used throughout. The observations covered 23 patients and extended over a period of five months. No internal or external treatment was given. Response was observed within a few days, except in 1 case where the dose was either too large or too small. In 3 additional cases failure was recorded. Moderate or very transitory improvement, was noted in 5 patients. In 13 of the 23 patients, the benefit was marked. In 8, most of the eruption disappeared, only a few modified small lesions persisting, usually on the elbows and knees. In 5, the eruption vanished completely; these included patients with large infiltrated plaques of long standing. However, 3 of the 5 showed recurrence. In all recurrence cases, the eruption was of a milder type. The authors regard this new method as one which produces favorable, although apparently temporary, results in a sufficient percentage of cases to justify its consideration as a practical procedure for the treatment of psoriasis.

ROENTGEN TREATMENT OF SCLERODERMA. Gerhard Hammer, Ascoli and Fagioli⁴ report a case of scleroderma in the induration stage which was not affected by the administration of extracts of thyroid and hypophysis, but improved markedly when stimulating doses of Roentgen rays were applied to the thyroid and hypophysis. It is impossible to say whether the thymus or thyroid was responsible for the results as both these glands were irradiated at the same time. Hammer also, in a case previously cited, irradiated these two glands. It may be assumed that scleroderma is caused by disease or hypofunction of various endocrine glands, probably by way of a neurosis of the sympathetic. This

¹ München. med. Wehnschr., 1920, **67**, 309.

² Journal of the American Medical Association, 1921, **76**, 1921.

³ Archives of Dermatology and Syphilology, 1921, **4**, 639-655.

⁴ München. med. Wehnschr., December 2, 1921, **68**, 1559.

is indicated by the good results of treatment with thyroid and adrenal extracts and of the treatment by irradiation with stimulating doses of various endocrine glands or gland complexes, the hypophysis and thyroid, thyroid and thymus, or the thymus alone. Hammer obtained good results from irradiating the thymus in Basedow's disease. This result may be regarded as an antagonistic action of the thymus against the hyperfunction of the thyroid, or as in scleroderma, of a direct action on the sympathetic by stimulating the thymus.

Dermatitis Medicamentosa. The introduction of new drugs, particularly of the coal-tar series, has considerably enlarged the number and type of cases of dermatitis medicamentosa. Almost all of the new drugs in susceptible individuals appear to be capable of inducing exanthems; sometimes only exceptionally but in other instances in a considerable number of patients.

DERMATOSES FOLLOWING THE ADMINISTRATION OF THE NEWER DRUGS. Lutz¹ reports cases and reviews the literature of cases reported by others.

Veronal and *medinal* may cause exanthematous rashes with fever after two or three small doses. Or the eruption may be a morbilliform, partly confluent, itching exanthem, or a localized, so-called fixed, eruption. In other cases, blebs may be produced.

Codeinal (*codein-veronal*) severely itching, bluish-red blotches of variable distribution.

Luminal. This drug causes variable appearing erythematous eruption which may be accompanied with congestion of the conjunctiva, mouth and pharyngeal mucous membranes, with or without fever. An urticarial eruption following its ingestion may occur.

Dial. A transient eruption resembling measles.

Adalin. Pruritus or urticaria.

Bromural. A drug belonging to the same group as adalin—a pustular tuberos bromide dermatitis.

Diogenal. A transient scarlatiniform eruption with fever.

Nirvanol (phenylethylhydantoin). A fever a few days after its ingestion, a few days later a peculiar bluish-red puffiness of the face, with edema of the eyelids and lips. Two days after this initial rash an eruption appears, which may be in the form of large or small blotches, or of a measles, scarlatiniform or urticarial rash. Some cases may be free from fever, and some may have only one type of rash while others present mixed forms.

Atophan—variable cutaneous manifestations—angioneurotic edema, erysipelatous swelling of the face, intense pruritus, scarlatiniform, urticarial and mixed rashes.

Antipyrin derivatives—*pyramidon*—cases have been reported in which appeared the following: erythematous elevated circinate lesions on the left cheek; enormous swelling of the lower lip and a severe pruritus over the face and neck, with an erythematopapular rash and partially urticarial exanthem, with petechiæ over the legs and feet.

¹ Therap. Halbmonatsh., 1921, **35**, 489.

, *Melubrin*. An eruption similar to that produced by antipyrin.
Aspirin (*Acetylsalicylic Acid*). The rashes described following the ingestion of this drug are comparatively uniform. In some cases, within an hour, a swelling of the face, chiefly of the eyelids and lips, appears generally accompanied by a swelling of the mucosa of the nose, face and pharynx, frequently with intense general indisposition. Some patients develop urticaria, others a scarlatiniform rash and still others conjunctivitis with edema of the eyelids.

Krysolan (*Sodium aminoauraphenolcarbonacid*) urticaria, dermatitis, petechial, aphthous stomatitis with fever, a small macular rash on the hands, chiefly the palms, redness or swelling of the skin and infiltration at the site of the injection may appear. A scarlatiniform rash on the face has been reported.

Thiosinamin and Fibrolysin. The most common lesions after fibrolysin injections are hemorrhagic (purpura). The eruptions may appear on the skin as well as on the mucosa of the mouth and nose. A measles rash or a scarlatiniform eruption.

Histamin (*B. imidazolylethylamin*). A confluent erythema composed of innumerable pea-sized spots all over the body. Less frequently an urticarial rash.

Urotropin (*Hexamethylentetramin*). An intense itching and burning eruption over the body which may be accompanied with swelling of the eyelids, congestion of the conjunctiva and urticarial lesions over the body.

Phenolphthalein. Although phenolphthalein has long been in use chiefly as a laxative, it is only comparatively recently that dermatologists have observed an eruption caused by this drug. Such instances have been reported by Ayres,¹ Wise and Abramowitz² and by Corson and Sidlick.³

In susceptible persons, the ingestion of phenolphthalein provokes a peculiar eruption of the skin. This eruption consists of a few widely scattered and numerous irregularly grouped polychromatic macular plaques, varying in diameter from that of a pinhead to several inches, varying in color from pink to bright red, dusky violaceous and deep purple; it is relapsing in course, chronic in nature and usually results in a protracted pigmentation of the affected areas of skin. Slight scaling may accompany the evolution of the lesions; a peculiar mottling is sometimes seen in the central zone of the macules; vesiculation, erosion and superficial ulceration may occur, more especially on the mucous membranes of the mouth and on the skin of the genitals; a burning sensation sometimes precedes and accompanies the appearance of the patches; moderate to severe itching may be a symptom during their evolution. The eruption, clinically, is a persistent multiform erythema, which, instead of vanishing without leaving a trace, persists more or less indefinitely and terminates in a yellowish-brown deposit of pigment in the affected sites. After the subsidence of the active lesions, relapses

¹ Journal of the American Medical Association, 1921, **77**, 1722.

² Archives of Dermatology and Syphilology, 1922, **5**, 297.

³ Journal of the American Medical Association, 1922, **78**, 882.

are apt to take place, following the ingestion of phenolphthalein. These relapses most frequently appear and reappear in the original sites of the primary eruption, but they may also occur elsewhere. Mild constitutional symptoms, such as headache, malaise, slight rise of temperature and pulse rate, may accompany the relapses.

The reactions in the skin and mucous membranes caused by phenolphthalein in patients having an idiosyncrasy for that drug, are apparently identical with those provoked by antipyrin. Such an eruption caused by antipyrin is reported by Milian and Perin.¹

The most frequent phenolphthalein eruption is the maculo-erythematous plaque; the interior of the plaque soon becomes markedly hyperemic; almost invariably a narrow pink peripheral zone surrounds the hyperemic area; the latter shows color changes due to the evolution of the lesion; it is at first red, soon assumes a dusky red hue, then becomes violaceous or deep purple (especially on the skin of the penis). Sometimes there is also a mottling. Finally, a dark brown pigmented patch occupies the site of the original lesion. During retrogression of the patch, faint scaling often occurs.

The next most frequent lesion is the erosive lesion of the lips, tongue and buccal mucosa. Here the resemblance to early syphilis and to pemphigus or erythema bullosum, is marked and may even give rise to great difficulty in diagnosis. The buccal and lingual lesions are usually quite sensitive.

The eruption may appear on any part of the body, but the mouth, genitals and lumbosacral region are areas of predilection. One of their patients had large palmar and plantar lesions.

In the case reported by Corson and Sidlick, constantly recurring attacks of urticaria were noted. These occurred after the ingestion of phenolphthalein; but the condition, until the history was more carefully reviewed, was thought to be a chronic urticaria from some undetermined food factor. This form of lesion has been reported as the result of administration of potassium iodide, chloral, quinine, santolin, copaiba, sodium salicylate, turpentine, opium, alcohol, belladonna, other coal-tar derivatives, and a number of other drugs as given in the foregoing; but so far phenolphthalein has never been included among their number. Recognition of the fact that it can cause such an outbreak may, with pointed questioning, clear up the etiology of other cases of presumably chronic urticaria of unknown origin.

It should be borne in mind that erythema is perhaps the commonest form of drug eruption. Although there are many forms of eruption due to drugs, only two—iodine and bromine and their salts—are capable of producing lesions which are special and peculiar. In almost all the other drugs the eruption itself follows a recognized type, it is chiefly from the circumstance under which it occurs that the cause is ascertainable.

Non-specific Therapy in Dermatology.—Many reports have appeared recently in the German literature concerning the *intramuscular injections of milk or turpentine* in the therapy of certain dermatoses. This form

¹ Bull. Soc. franç. de dermat. et de syph., 1921, No. 8, p. 385.

of nonspecific therapy, autoserum therapy can be placed in the same category, is not new. For many years the injections of milk have been employed in certain quarters, particularly in the treatment of *arthritis*. It appears that it has become a popular form of therapy in many fields in medicine.

Ahlswede,¹ of Hamburg, discusses this form of therapy.

Recent works tend to show that many substances, the so-called foreign proteins and their derivatives, may, when injected, cause leukocytosis and certain changes in the blood. These proteins may be derived from disease germs or they may consist of other animal substances, such as serum, proteoses and milk. Marked improvement and even permanent cure may result in certain diseases.

The idea of the nonspecific form of treatment, which is usually protein therapy, is, roughly, this: The defensive action of the body can be strengthened, and its efficiency augmented, by intramuscular injections of proteins. The exact method of action in these cases is problematic and still lacks a definite explanation. The agent most commonly used in this country is a milk-albumin solution which is germ-free and toxin-free, and prepared under an exact bacteriological technic.

A practical example will best serve to explain the effect of intramuscular injections of nonspecific protein bodies. Take, for example, a fresh case of *sycosis barbae* and a *crural eczema*. Ten cc of a solution of germ-free and toxin-free milk-albumin is injected into the buttocks. In from six to ten hours, on an average, the patient will have what is generally called a ticklish, itching sensation on, and in, the affected part. A local reaction has been effected, and the sycotic area shows more acute signs of inflammation and suppuration. If another injection is made a few days later (from three to four) to which a third and fourth may be added at the same interval, the topical process will attain its height of reaction far sooner than mere local treatment of the sycosis, the reaction will die down, and, if the injections are pushed, the defensive action of the body being stimulated at the utmost limit, a complete cure of the sycosis may be attained.

Müller holds that the immunizing activity of the bone marrow, responding to the nonspecific stimulation by milk proteins, is strengthened. This is judged both by the development of fresh granulated neutrophile leukocytes and the increase of defensive reagents in the serum, which are led to the various foci of infection in the system and there become visible; for example, furunculosis and sycosis parasitaria. They either form the beginning of a healing process or they support already existing defensive measures of the body. It is all important that these defensive measures, the intensity of which may be measured by the local reaction, shall not be stimulated beyond the degree required, as the milk proteins do not directly influence the foci of infection but act only on the myeloid (bone marrow) system and its immunizing functions. As to the red blood corpuscles, the myeloic effect of milk protein injections on these becomes visible only in cases of pathological

¹ Archives of Dermatology and Syphilology, May, 1922.

diminution of the erythropoietic function. Here a rise in the number of the red blood corpuscles is seen.

The injection of a germ-free and toxin-free solution of *milk-albumin* is indicated in all local and generalized infection, in acute and chronic staphylococci diseases of the skin (furunculosis, pyoderma, etc.), in superficial and deep trichophytia, in buboes, gonorrheic complications, carbuncles and cases of chronic suppuration. Milk-albumin injections are indicated, furthermore, in cases of acute infectious diseases and anemias. The injections are best made into the buttocks (similarly to mercuric injections; avoid the vessels). No hard and fast rules can be laid down concerning the number of the injections and the interval between injections.

Weichardt, Klingmüller, Linser and Müller reported, at a meeting of the Twelfth Congress of the German Dermatological Society held in Hamburg, May, 1921, on the theory and practice of nonspecific parenteral treatment. Reports of excellent results obtained with this method in the treatment of furunculosis, deep trichophytosis and eczema were made. Klingmüller employs a 10 per cent mixture of turpentine in olive oil, giving 1 to 10 cc twice, with a three-day interval; injection is made deeply in the gluteal muscles, even down to the bone. Klingmüller could not explain how this agent acts—he does not think that a direct influence on lesions thus treated is possible.

Müller, of Vienna, speaking of injections of milk, said that the greatest effect of these injections was obtained in transudation and hyperemia. He thinks the stronger inflammation is caused by the changes in the colloidal balance of the blood serum. From 5 to 6 cc of milk are injected several times, however, not before the patient has recovered from the reaction following the preceding injection. From one to two hours after the injection the patient has chills and there is a rise in temperature, the height of which is attained within from ten to twelve hours. There is at first a leukopenia, then an increase of the leukocytes. This treatment is most successful in epididymitis, periurethritis, prostatitis, buboes and affections of articulation. It is also effective in the eczemas and in trichophytosis.

Linser advocated parenteral treatment with normal serum. He had great success with serum of pregnancy in cases of herpes gestationis. He now treats eczema with large doses of healthy serum. Some of the successes obtained with tuberculin, gonococcal and staphylococcal vaccines are ascribable to the non-specific components.

Experimenting with Klingmüller's method of injecting turpentine in a variety of dermatological diseases, Tenenbaum¹ employed a 10 to 20 per cent emulsion of rectified turpentine oil in pure sterilized olive oil in 120 cases. The largest dose used for a single injection was 2 cc. Injections twice weekly proved to be sufficient. Lupus erythematosus and rosacea, owing to their chronic character, did not permit of a final estimate. Psoriasis proved rebellious and a similar experience is reported in a case of pemphigus. Lesions of impetigo contagiosa, the

¹ Medical Record, 1922, 101, 54.

crustaceous as well as the bullous type, cleared up quickly after one or two injections with no local applications. In folliculitis barbæ, the optimism of various authors does not seem justified. The treatment seems to act exactly as do the vaccines. More or less good results have been noted in furunculosis, pyoderma, and suppuration of the sweat glands. In tinea, the superficial and particularly the deep type, turpentine proved of assistance in association with local treatment. Cases treated with turpentine and 3 to 5 per cent resorcin paste, healed more quickly than with other methods of routine treatment, except roentgen rays. Good results have been obtained in some cases of acne; acne indurata yielding readily while results in acne simplex were not so striking. The most satisfactory results were observed in ulcera cruris. In the urticaria group, including lichen urticatus and prurigo mitis, and in the so-called neurodermites, the results were not uniform. The eczema group, except for a drying-up effect on weeping and impetiginous lesions, did not encourage further trial. Though not an enthusiast, this experience leads Tenenbaum to conclude that the injection of turpentine is valuable in the treatment of pyogenic infections of the skin. Furthermore, this remedy was found useful in acute inflammatory affections of the skin as well as in chronic exudative lesions. The best results were noted in ulcer of the leg. Tenenbaum states that injections of turpentine act on the disease by exerting a stimulating effect on the general vitality of the system.

Tropical Inguinal Granuloma in the Eastern United States. An increasing experience is teaching us that many diseases, formerly regarded as tropical and limited to foreign countries, are found on this vast continent of ours. The medical profession was astounded some years ago to find that pellagra, a disease largely endemic in Italy and northern Africa, was widely prevalent in the Southern States. Another disease which was presumed to be restricted to tropical or subtropical countries has been developing with considerable frequency in the Eastern and Southern sections of the United States.

Randall, Small and Belk call attention to a condition supposedly occurring only in the tropics, but which has recently developed an endemic existence in the temperate parts of the eastern United States.

Under the following variety of names tropical inguinal granuloma, tropical ulcer, venereal granuloma, granuloma inguinale, and granuloma pudendi, there has been recognized by physicians practising in the tropics, and especially South America, a disease which was supposedly limited to these countries.

Recognizing the similarity of the cases reported last year by Symmers and Frost to certain cases that have been repeatedly seen on the urological service of the Philadelphia General Hospital, a round-up was instituted which resulted in getting together 15 cases. A study of these cases is reported.

The first and most important fact, when making such a diagnosis of a supposedly tropical disease as present in the temperate zone, is the unquestioned accuracy of the diagnosis. Randall, Small and Belk refer to the work by Aragao and Vianna, of Rio Janeiro, who are probably

the world's authorities on this condition, and the originators of the specific antimony treatment, and have been able to corroborate and substantiate in their cases all the bacteriological data that Aragao and Vianna report.

This disease has been present, practically constantly, in the Philadelphia General Hospital as long as any of the attending physicians and nurses can remember. It has masqueraded both here as elsewhere under various other diagnoses, among which may be mentioned lues, now ruled out, as in fact it has always been, by the repeatedly negative blood tests, lack of specific history and absolutely negative results with arsenic therapy; as chancroidal infection, to which it rarely bears any similarity, as destructive ulceration is particularly not a characteristic; as tuberculosis, though never substantiated by microscopic study; as condylomata, to which when seen in the female or about the anal region it bears a close similarity; and as carcinoma, to which the microscopic picture in two or three cases was almost typical. It is not definitely known how the disease is contracted.

BACTERIOLOGY. Direct smear preparations of the exudate from the lesions stained with Wright's stain have demonstrated in all their cases encapsulated bacilli within the cytoplasm of the large endothelial cells. This finding has come to be regarded as diagnostic of the condition.

When properly stained these organisms appear as dark blue coccoid, diplococcoid or bacillary bodies surrounded by a pink capsule. These encapsulated forms may occur free in the exudate, but they have not been observed within the polymorphonuclear leukocytes.

In cultures, this organism grows on all the simpler laboratory media. An acidity represented by Ph 6.0 permits luxuriant growth. On agar surfaces the growth is typically that of organisms of the *Bacillus mucosus capsulatus* group. By its various cultural reactions, the organism cannot be differentiated from this group.

Lesions in laboratory animals typifying those observed in man have not been produced by inoculations of this organism.

CLINICAL STUDY. The usual history is that the lesions started as a small papule, non-inflammatory, which, after rupture and the exudation of a slightly purulent fluid, refused to heal, and exhibited progressive tendencies toward slow proliferation and spreading. The lesion in its purity (especially seen when involving the inguinal region) is a flesh-red, exuberant overgrowth of soft granulation tissue. It has absolutely no similarity to an ulcer, with its eroding, undermining, necrotic base. The center of the granuloma appears slightly depressed, and there is certainly a destructive action present, but the edges are redundant and overlap the apparently healthy skin margin. Exudate is scant, mucoid in character, of a nonoffensive odor, and when wiped with gauze is easily removed, leaving a clean, blood-red surface, similar in every respect to a large area of healthy granulation tissue as seen in clean surgical wounds. This picture varies according to the duration, size and location. The older lesions show at times tendencies toward cicatrization at some points while spreading in others. The patient has few subjective symptoms. They suffer no pain, tenderness or dis-

comfort unless the involved areas are so placed as to cause chafing. All of our cases, with one exception, have occurred in the negro.

DIAGNOSIS. The clinical diagnosis is based entirely on the bacteriological finding of the specific organism. This is done by making smears from the exuding surface, in which will be found numerous large mononuclear plasma cells, whose protoplasm, on proper staining, will be found studded with the characteristic encapsulated bacillus. The therapeutic result from the use of antimony, intravenously, may likewise be taken as indicative of the accuracy of the diagnosis, for after three or four administrations the organism disappears entirely from the surface and cannot be found in smears.

TREATMENT. As pointed out by all previous writers and substantiated by the histories of cases in the Philadelphia General Hospital in years gone by, the treatment of these lesions has been most disappointing until the present, when *antimony* was first instituted.

Local applications of salves, escharotics, and antiseptics do no good whatsoever; vaccine therapy has been consistently a failure; excision is followed almost uniformly by recurrence before healing; arsenic is of no benefit, but the roentgen ray may give curative results, requiring on an average from twelve to sixteen months to establish healing.

Following Vianna's work, they started giving antimony intravenously in the form of tartar emetic. The initial dose of 0.004 gm. was used, and this quickly advanced to a maximum dosage of 0.1 gm. The first treatments were given daily and most patients tolerated this until ten doses had been given, but nearly all after that amount showed some symptoms of intolerance for the drug. The authors therefore began interrupting the daily dosage, governing the time by symptomatic data.

The drug has been prepared by dissolving 0.1 in 10 cc of saline solution and is best put up and preserved by sealing, under sterile precautions, in small-sized, glass ampoules. Intravenous administration is essential.

The lesion becomes bacteriologically sterile after the second or third dose of the tartar emetic. Healing commences within forty-eight hours after the first administration, and from then on almost daily progress can be appreciated. Epithelial proliferation starts at the edges and rapidly spreads inward, while often isolated islets of epithelium in the midst of the granuloma, before not seen or buried, start proliferation in the midst of the lesion and hurry the complete healing.

In some cases the administration of the drug causes a tingling, pricking sensation in the granuloma, immediately after the injection, and oft-times an excess of mucoid secretion occurs for the first few days. Scabbing over of the surface takes place wherever the raw surfaces are in apposition, and thin crusts form around the periphery of open areas.

RESULTS. Of the 11 personally observed cases, 8 are healed. Following the advice of Vianna, all patients are given a course of injections after complete healing has been accomplished to prevent the possibility of recurrence.

Porokeratosis. A comprehensive study of a case of porokeratosis occurring in a Greek, forty years of age, is made by C. S. Wright.¹

¹ Archives of Dermatology and Syphilology, October, 1921.

The disorder had occurred in the Greek's family for generations and persisted throughout life.

About 60 cases of this disorder have been reported in the literature and an excellent review of the reported cases is made by Wright. Concerning the *etiology*, the author reviews the numerous theories that have been advanced and the experimental work that has been directed toward that end, but concludes that the etiology remains entirely unknown. A study of the *age incidence* shows that the affection may begin at any age, most commonly in the earlier years of life. There is a distinct predilection for the hands and feet, genitals, buttocks and scalp, although the lesions may appear at any site. The percentage of cases in which the lesions of the mucous membrane occur is high, though not exactly known, for in some instances they were unrecognized and occasionally were not looked for. The palms and soles are almost invariably free, although one or two exceptions to this have been recovered. Mibelli, in his first work, laid stress on the constant involvement of the sweat ducts and believed that the disease had its origin in the mouths of the ducts. Respighi, in his simultaneous publication, held that the sweat duct orifices and the follicles shared equally in the process and that either might be the point of origin.

Treatment of the condition consists of complete excision. Carbon dioxide snow is also of value, but in the very extensive cases these methods are impracticable. Radiotherapy has no effect other than a slight lessening of the pruritus. The classification of porokeratosis has occasioned a great deal of discussion. From a résumé of the clinical and histological characteristics, it would seem that it might best be placed among the verrucae or the nevi. In favor of the former is the wart-like appearance of the lesions, particularly in the earlier stages. Histologically, the epidermal and papillary hypertrophy and the marked hyperkeratinization correspond to the picture of verrucae. The familial tendency, the persistence of the lesions throughout life, the absence of inflammatory changes, the noncontagiousness, the occasional symmetrical distribution and the failure to respond to the roentgen ray speak strongly in favor of the placing of porokeratosis among the nevi.

The Relation of Lupus Erythematosus Discoides to Tuberculosis. The question of relationship of lupus erythematosus to tuberculosis has interested dermatologists since the time of Cazenave, who gave the disease its present name and considered it probably identical with lupus vulgaris. Recently, certain American authorities have expressed doubt as to the specific tuberculous origin of this dermatosis, and seem to favor multiple etiological factors. To verify his clinical impression, Goeckerman¹ made a statistical study of the material in the Mayo Clinic and approached the question by four different avenues.

The percentage of clinical tuberculosis detected in patients with lupus erythematosus discoides chronicus, who had been adequately studied for tuberculosis, was estimated, and it was found that the incidence of clinical tuberculosis in dermatoses admittedly of nontuberculous origin

¹ Archives of Dermatology and Syphilology, June, 1921.

was 32.1 per cent, approximately as high as in lupus erythematosus, which was 35.7 per cent. The records were searched for patients with dermatoses ordinarily not associated with tuberculosis in order to determine for comparative purposes the frequency of clinical tuberculosis in these dermatoses. No record was used which did not show evidence of an adequate examination for tuberculosis. In this group, which included dermatoses like erythema multiform and erythema nodosum, clinical tuberculosis was found in 32 per cent of the cases. Clinical tuberculosis, therefore, is no more frequent in those disorders, which are in some instances known to be of tuberculous origin than it is in lupus erythematosus discoides.

The frequency of clinical tuberculosis in patients with known tuberculides (84 per cent) presents a striking contrast compared with the frequency of clinical tuberculosis observed in lupus erythematosus discoides chronicus (35.7 per cent). This contrast is so great that the belief seems acceptable that lupus erythematosus discoides chronicus cannot have a pathogenesis identical with that of tuberculides. The tuberculous origin of lupus erythematosus discoides chronicus has not been proved by experimental work. Clinical observation, including this statistical study, seems to favor varied etiological factors.

Fungus Infections of the Skin. **RINGWORM OF THE NAILS.** The report of Hodges¹ is a valuable contribution to the study of ringworm of the nails. He studied 16 cases and has made cultures in 12 of these cases. In dermatological practice ringworm of the nails is very rarely observed. Foster, reporting his experience with the immigrants at Ellis Island, found only 1 case in about 5000 immigrants. It is a surprising fact, however, that Hodges found 16 cases in a city having only about 12,000 people. This would make the ratio of at least 1 case to every 500 population, a prevalence ten times greater than that reported by Foster among foreign immigrants at Ellis Island.

Of the 16 cases of onychomycosis observed, cultures have been obtained in 12 of the 13 cases in which cultures have been attempted at the time of making this report. The entire absence of a history of ringworm of the scalp associated with any of these cases would, it is believed, exclude the probability of *Endothrix trichophyton* as a cause. That 11 of these cases were caused by large-spored *Ectothrix trichophyton* is indicated by finding, in associated skin lesions, lanugo hairs attacked by a fungus apparently of this variety. This conclusion is further strengthened by their rapidity of development on culture mediums and other cultural characteristics.

The species, pending their more definite classification, are designated as *Trichophyton* "A," *Trichophyton* "B" and *Trichophyton* gypseum, variety "C."

Trichophyton "A" (7 cases) produces white downy cultures on Sabouraud's maltose agar, usually showing a pink color on the surface and purplish red from the back. Drop cultures show pyriform conidia borne on simple and branched conidiophores, and more rarely characteristic slender fuseaux.

¹ Archives of Dermatology and Syphilology, July, 1921.

Trichophyton "B" (4 cases) produces on Sabouraud's maltose agar pronounced white downy cultures, tinged with yellow as they grow older. Drop cultures show pyriform conidia, not very abundant.

Trichophyton gypsum, variety "C" (1 case), produces on Sabouraud's maltose agar rapidly growing, white, downy cultures which develop a cream color later. Drop cultures show spirals, fuseaux and spore clusters characteristic of the gypsum group. This group belongs to the small-spored ectothrix variety, and is believed to be reported for the first time as generally accredited to ——— epidermophyton.

That the species designated "A" and "B" are specifically inclined to attack the nails is indicated by the frequency with which the nail affection follows and coexists with ringworm of the hands and feet among several members of the same family. The possible relation to the group of which Trichophyton rosaceum and Trichophyton equinum are members, or their being new species, is considered, but pending a comparative study with Sabouraud's type cultures definite classification is withheld for a future report in which it is hoped to include a study of additional cases and their etiology.

The frequent coexistence of tinea cruris with these nail conditions and the demonstration that in one case the fungus was the same as the one infecting the nails, suggests that species of Trichophyton may be responsible for many cases of this affection which is so prevalent and which is generally accredited to epidermophyton.

Some tests of the Sabouraud maltose and glucose are given which show them to be of very much the same composition, both consisting largely of dextrose (glucose). This accords with comparative results of cultures on mediums prepared with these two crude sugars.

That the nail affection will yield to persistent treatment with Whitefield's ointment, combined with thorough scraping of the nails, is demonstrated by a complete cure of two patients in whom all of the nails on one hand were affected.

More recent investigation since this manuscript was written has definitely established that the species designated Trichophyton "A" and probably Trichophyton "B" are identical with a species described almost simultaneously in 1910 by Bang as Trichophyton purpureum and by Castellani as Epidermophyton rubrum. Later, Sabouraud, in whose laboratory Bang's work was done, acknowledged the priority of Castellani's discovery and observations.

Bang considered the species to be of American origin. It was noted by both Bang and Castellani as producing a special type of tinea cruris with a tendency to spread to other portions of the body.

VACCINE THERAPY OF TRICHOPHYTOSIS BARBÆ. Arzt and Fuhs¹ report statistics of the extent of the epidemic of trichophytosis barbæ in Vienna, together with observations on symptomatology and treatment.

From 1914 to 1919 inclusive, 2573 cases of trichophytosis were seen in that city. Of these, there were 890 cases of parasitic sycosis. The

¹ Dermatol. Ztschr., February, 1921.

infection first appeared in the troops in the field and was spread about among them, and when they returned to their homes, this infection was carried to the barber shops and thence disseminated to greater numbers of the civil population. The most common fungi found in these cases were *Trichophyton gypsum* and *Trichophyton cerebriforme*.

In addition to the various local applications, the authors give the results of specific treatment by means of various vaccine preparations. One of these was known as "Trichon," which consisted of mixed *Trichophyton cerebriforme* and *gypsum* made by Schering. Another was known as "Trichophytin Hoechst." This consisted of mixed *Trichophyton*s of which the particular fungi are not named. Number 3 consisted of a vaccine of *Achorion quinckeanum* extract made by Bloch and is known as "Trichophytin Bloch." The fourth preparation was known as the "Weiner Trichophytin," made by Busson in Vienna. Owing to the marked reactions taking place after the injection of the various trichophytins, the vaccines were of considerable value in reaching the diagnosis in the doubtful cases. The results seemed to indicate that the specific vaccine therapy hastened the healing of the cases.

EPIDEMIC OF RINGWORM OF THE SCALP IN BERLIN. A report of 300 children affected with ringworm of the scalp is made by Buschke and Klemm.¹ The ages of the children varied from two to fourteen years. Most of them, however, fell in the group averaging in age from six to ten years. The proportion of boys to girls was about 3 to 2. Most of the cases fell within one of two clinical types. Either there was one or more sharply defined scaling plaques or there was a diffuse invasion of the entire scalp with more sharply defined coin-sized lesions scattered over the scalp. In this second type, the lesions were not separated by normal scalp, inasmuch as infected hairs were found everywhere. In some cases it was not possible to determine how extensive the infection was until the scalp was clipped, and then it was seen that innumerable follicles were invaded. About 60 per cent of the cases fell in the first group. Most of the children had only one plaque, averaging from 3 to 7 cm. in diameter. This type of case, however, was extremely resistant to treatment. The individual plaque was very much the same in all cases. It consisted of a fairly well-defined area in which the hairs were all of about 1 mm. in length. The area was of a grayish white and at the periphery there was a moderate degree of erythema. Some of the cases had a very marked inflammatory reaction and had more of the clinical appearance of trichophyton rather than of a microsporon infection. In some cases it was impossible to distinguish clinically between the two. In 6 of the cases, the inflammatory reaction was such that a kerion had been produced. In about 25 per cent of the cases, there were lesions elsewhere on the child, principally on the face. Most of the lesions on the glabrous skin yielded promptly to treatment, and some of them spontaneously healed.

The treatment at first consisted solely of roentgen therapy, but the systemic disturbances, such as vomiting, dizziness, headache, and

¹ Dermatol. Wehnschr., June, 1921.

dermatitis, were so severe and recurrences were so common that this was finally abandoned. Various experiments were carried out with local applications. It was finally determined that pyrogallol ointment was of the most service. The routine treatment consisted of painting the plaques with sterilisol. After from two to four days the crust which formed became loosened and fell. With the crust, all of the scales and the affected hairs were removed. Around the plaque was then applied zinc paste and in the center was applied the pyrogallol salve. They began with a 5 per cent ointment, and gradually increased it every second day until 20 per cent was reached. A sharp vesicular reaction occurred, and daily there was formed a mass of crusts and secretion which was removed with boric ointment. The removal of the crust was very painful but after a time the discomfort ceased. The process was continued on an average of ten days, after which simple boric acid ointment was applied. In some cases granulations appeared which were then painted with silver nitrate. Owing to the rapidity with which pyrogallol is absorbed, not more than half of the head should be treated at one time. About 50 per cent of the children were completely healed in from four to seventeen weeks. Ninety children were treated in this way. The authors recommend a careful examination of the urine during the pyrogallol application.

In the foregoing report Busche and Klemm state that the roentgen ray was a failure in the treatment of microsporon infections of the scalp. This is not in accord with the experience of Kleinschmidt,¹ of Essen. Since 1916 this writer has epilated 231 children without in any case having any untoward symptoms. Epilation occurred with machine-like precision in the third week and by the fourth week the scalp was absolutely bald. Between the seventh and eighth week the hair began to grow in and after three or four months the scalp was covered with normal hair. After epilation had taken place, the author used 5 per cent pyrogallol vaseline or 10 per cent salicylic acid vaseline. He is convinced that in his own experience, at least, radiotherapy offers the best, quickest and surest method of treating microsporon infection of the scalp.

My experience with the roentgen ray is in accordance with the foregoing experience of Kleinschmidt.

Some children exhibit a slight elevation of temperature, anorexia and restlessness. These symptoms are not common and do not have any significance. Ordinarily the defluvium begins about the end of the second week and is complete by the twenty-first day. The diseased hair falls out but some healthy hair may remain. A complete defluvium is not absolutely necessary for a cure in the majority of cases. However, the treatment is a failure if the depilation is too incomplete. To successfully employ the roentgen ray in the treatment of ringworm of the scalp, the epilating dose of the particular machine employed must be known. The hair begins to regrow in from one to three months subsequent to the defluvium. If there is no evidence of regeneration in six months permanent alopecia is invariably the result.

¹ *Dermatol. Wehnschr.*, August, 1921.

Permanent alopecia is, of course, a possible danger, when this occurs an antecedent radiodermatitis of at least the first degree must have occurred. For the production of a radiodermatitis a dose greater than the epilating one is required. It is true that permanent alopecia following the roentgen-ray therapy of tinea has from time to time been reported, particularly when the method was first employed. In recent years, however, since the technic has been perfected and in the hands of experienced operators such a possibility is negligible.

YEAST INFECTIONS OF THE SKIN. Greenbaum and Klauder¹ report cases and studies on the cutaneous yeasts.

Of the many genera of the family of Saccharomycetaceæ, comparatively few play an etiological role in dermatomycoses. The most important and the most frequent dermatological lesion caused by yeasts is a deep infection first described by Gilchrist in 1914, and commonly known as *blastomycosis*. This dermatomycosis is caused by the genera *Saccharomyces* (*Blastomyces*), *Cryptococcus* and *Coccidioides*. The peculiar warty lesions and abscesses that characterize this affection are well known. On the other hand, yeast infection may occur superficially. Thrush is the best known instance. Other instances, of less frequent occurrence, are pointed out with particular reference to an infection known as *intertrigo saccharomycetica*, cases of which are reported.

Thrush, caused by *Oidium albicans* and certain species of monilia, occurs as a white or creamy adherent membrane on an erythematous base, most frequently on the oral mucous membranes of infants. It may also exist as a mycosis in the vagina, especially of pregnant women, on the nipples of women nursing infants affected with the disease, and as a dermatomycosis. Instances have been reported in which this fungus has given rise to constitutional disease. In these cases, necropsy has shown abscesses in various parts of the body.

A review of the literature is made of cases of dermatomycoses in which yeasts were ascribed as the cause.

Intertrigo saccharomycetica is perhaps the most common instance of yeast infection. The writers report 7 cases affecting the interdigital spaces and reviews the literature of other reported cases. It attacks the intertriginous regions, the axillæ, groins, gluteal fold and the interdigital spaces of the fingers. The affected part consists of an irregular inflamed patch, sharply margined and non-elevated, which is usually moist from exudation. Two types of lesions are described. The first type is a dry lesion showing a bright red derm beneath a smooth glistening thinned epiderm. The other type is a lesion composed of an accumulated mass of undermined sodden epiderm, moist and white in color. The types of yeasts obtained from these lesions are described. Three of the four types found were *saccharomyces* and one a *cryptococcus*.

A study of the saccharomycetic flora of the normal skin was made of 150 persons. The types of yeasts obtained from this study conformed to the four types of yeasts obtained from the cases of *intertrigo*. Only

¹ Archives of Dermatology and Syphilology, 1922, 5, 332-334.

one type, a cryptococcus obtained from one of the cases of intertrigo, was found to have pathogenic properties when injected into the peritoneal cavity of guinea-pigs.

Greenbaum and Klauder state that it appears from their studies that yeasts like cocci, which are found normally on the skin, may, under certain conditions, become pathogenic and cause a superficial infection. This they believe occurs not infrequently.

Treatment of Intertrigo Saccharomycetica. In all of their cases, with one exception, and in the majority of the cases reported, the infection was readily amenable to treatment. The use of the following agents is advised: Tincture of iodine 10 per cent, or 1 per cent chrysarobin iodine salve. Keeping the lesion dry is an important factor in cure. Under this condition the infection, in all but one of their cases, readily disappeared after the use of a variety of mild parasiticide ointments. The one exception was in Case 5, in which the infection has existed for eight years and has so far been resistant to the use of strong parasiticide ointments. The patient does housework and is compelled to immerse her hands in water. This they believe is a factor in the resistance of the lesions to treatment.

It is to be noted that cases of intertrigo saccharomycetica, which Greenbaum and Klauder describe, presents an exact resemblance to ringworm infections existing in the same locality—the interdigital spaces. Indeed, the majority if not all instances of a dry or moist eczematous lesion in this locality are due to a fungi. Differential diagnosis between intertrigo saccharomycetica and ringworm can only be made by laboratory studies. Nor is it essential that differential diagnosis be made, since both conditions are amenable to parasiticide ointments.

Radium in Dermatology. Broeman¹ reports obtaining favorable results in the treatment of 50 cases of basal-celled variety of *epithelioma* located on the face, neck, ears, scalp, arm and thigh. In *epithelioma* of the eyelid, radium therapy was especially successful. With the prickle-celled type, located on the face, forehead, mouth and tongue, the writer has not been so successful. He believes this to be because in such a malignant growth, prone to metastasis, nothing can be accomplished unless treatment is undertaken very early. All his unfavorable results were in cases of long standing. If radium is applied early enough, it will seldom fail to cure any form of cutaneous cancer. The prompt treatment of any suspicious nodule, whether it is possible to differentiate between the basal or the prickle-celled type or not, would greatly increase the percentage of success.

In applying radium to the superficial basal-celled *epithelioma*, the half-strength, 10 mg. radium plaque, is the most desirable apparatus to use. In treating *epithelioma* of the eyelids, or even of the eyes themselves sometimes the plaques will suffice, but more often tubes are necessary, especially when the inner canthus is involved. It is important to administer all treatments within ten days, so that the last treatment will be finished before the reaction occurs. For the treatment of prickle-

¹ Ohio State Medical Journal, December, 1921.

celled carcinoma of the face, from 50 to 100 mg. of radium should be applied, with heavy screening, such as brass or lead, at a distance varying from $\frac{1}{4}$ to 1 inch, the exact dose and technic depending upon the conditions at hand.

Secondary glandular involvement should receive deep massive treatment, but if the glands do not respond promptly to the rays, surgery should be employed. A case of *endothelioma*, of twenty-four years' standing, involving the right parotid gland, showed no sign of recurrence after a year and a half, disappearing after three treatments of 600 mg. hours each. In cancer of the lip, when no glandular involvement has occurred, radium is preferable to any other means of treatment. At least 50 mg. must be used, preferably in the form of one or two 25-mg. tubes. The first application should be for at least six hours, and the tube should be well screened, with at least $\frac{1}{2}$ in. distance between the tubes and the surface of the lip.

As a prophylactic measure, deep, radium exposure should also be given to the cervical region; but when the glands are enlarged the use of radium should be confined to the lip and the glands extirpated by surgery. Good results have been obtained with the large tuberous vascular angiomas, and the so-called "port-wine stain" may be greatly improved if treatment is begun early in life. The spider nevus is best treated by the electric needle. In handling either the pigmented or vascular nevi, care must be observed not to overtreat the patient. In applying radium to keloids, the size and location of the growth must be taken into consideration. The plaque will give good results if the keloid is small and of not too long standing.

Morrow and Taussig¹ report their experience in the treatment of epitheliomas of the face with radium. They state that the great majority of dermatologists are now ready to admit that in most cases of basal-celled epithelioma, radiotherapy alone, or in combination with curettage, is the treatment of choice. The one disadvantage of radium is the time consumed. If bone is involved, it is best to curette thoroughly. The use of buried needles or bare tubes is rarely indicated in epitheliomas of the face. The only exception is in cases of rodent ulcer, which is deep and nodular and refractory to the usual form of radium therapy. In treating a superficial rodent, a full strength plaque, screened with rubber dam only, or with 0.1 mm. of aluminum, is fastened over the lesion for a total dose of from three to four hours, divided over two to three successive days. This dose may be given at one sitting but increases the reaction. If the lesion is relatively deep, from 0.3 to 0.5 mm. of brass is employed as a screen and the time increased to five or six hours. If tubes are used the dosage is roughly 40 millicurie hours per square centimeter of surface, the tubes being distributed as nearly as possible so that there is 1 tube to each square centimeter. The usual screen when tubes are utilized is 0.5 mm. silver and 1 mm. rubber tubing. Any of these methods produces a severe reaction starting on the seventh to the tenth day and reaching its height

¹ Archives of Dermatology and Syphilology, January, 1922.

at the end of the second week. Exudation and crusting occur, and finally about the sixth week the last crust comes away leaving a smooth, white, supple scar.

Epitheliomas of the ears present considerable difficulty both as to diagnosis and treatment. Thicker screens should be used and the time increased accordingly. Early epitheliomas of the lip do well under proper radium treatment. The very extensive cases do no better after radium than after surgery. Massive radiation may do harm in such cases and conservative treatment only should be attempted. Squamous-celled carcinoma of the face may occur anywhere aside from the lip and ear. In general it conforms to either the mushroom or fungating type or the infiltrating type. One may merge into the other. Surgery is of value and wide excision is the rule. Cosmetic effect must not be thought of. Buried tubes or emanation should be employed, and this treatment augmented by surface application. The lymph gland area should also be treated.

Crude Coal-tar in Dermatology. White¹ reports excellent results from the use of coal-tar in the treatment of certain skin diseases. He employs it in 5 per cent strength in the following way.

Crude coal-tar and zinc oxide, each 2; cornstarch and petrolatum, each 16. The last two ingredients are mixed; the first two are rubbed together, and then both are combined. A vegetable tar is too strong and should not be used. Special precautions must be exercised when applying the preparations; all hair should be cut short; no bandage should be applied; the tar should be smeared on thin and covered. The same crude tar dressing should never remain for more than twelve hours. To remove discoloration from linen, both sides of this should be impregnated with lard and then washed in soap and water. Brocq originally limited the use of crude coal-tar to varicose ulcers, but White employed it in infantile eczema, moist eczema of adults, anal and vulvar pruritus, neurodermitis, especially of the occipital region, chronic papular urticaria bordering on prurigo, and the very moist types of epidermophytosis.

The Treatment of Pruritus Ani with Vaccines. A report of the results obtained in 50 cases of pruritus ani treated with autogenous vaccines is made by Winfield.²

This method of treatment was probably first employed by Murray, of Syracuse, who has previously reported most favorable results.

In all the 40 cases, the colon bacillus was obtained from the exudate and in 30 the *Streptococcus fecalis* was demonstrated. Five of the patients in whom the colon bacillus alone was found were treated with a stock vaccine, and the results were as good as when the autogenous vaccine was used. The number of injections necessary to cause an improvement in the condition averaged above five; permanent relief from itching and improvement in the condition of the skin were usually obtained after the patient had received from twelve to fifteen injections. The number of organisms given in each dose ranged from five hundred

¹ Archives of Dermatology and Syphilology, December, 1921.

² Ibid., November, 1921.

thousand to one hundred million. Constitutional reactions occurred in 10 cases. In all of the 50 cases cure or relief was obtained by treating the patient with vaccine made from these cultures. Other means of treatment, including the roentgen ray, had previously been tried in sundry cases of this group without benefit.

A tinea infection may cause a pruritus of the anogenital region closely resembling true pruritus. The differential diagnosis between the pruritus caused by the bacillus or streptococcus and that caused by the fungus is easy. The itching caused by the epidermophyton is secondary to an inguinal dermatitis; the skin is neither white nor macerated, and the irritation extends backward over the genitals along the perineum and anus. The pruritus caused by the colon bacillus or streptococcus begins at the anus and progresses forward, the skin being macerated and whitish in color. In both types the itching may be equally severe; in the fungus type it is more readily relieved by scratching and does not seem to the patient to be so deep-seated.

SYPHILIS.

The Wassermann Test. The Wassermann test is the most important biological reaction employed in medicine. It is not a specific test in the accurate sense of the term, inasmuch as the antigens used are non-specific, and there is no union of a specific antigen with the antibody in the blood. Indeed, relatively little is known of the nature of the Wassermann reacting substance in the blood. It is not believed that it is an immunological substance; it is possible that it is a product due to the action of the spirochete on body cells.

Like all biological tests, the Wassermann test has its limitations. Its great fallibility is in the negative outcome. To be sure, one occasionally encounters falsely positive tests, but with good laboratory technic they are extremely rare. False negatives, however, are excessively common and, unfortunately, they occur in the very cases in which we most need diagnostic support. It is rare to encounter a negative Wassermann reaction in the presence of frank and extensive manifestations of syphilis. In these cases the serum reaction is not necessary to establish the diagnosis. It is in late circumscribed lesions or in cases of obscure visceral involvement that the Wassermann may be negative, and it is just in such conditions that we desire laboratory aid to fortify our clinical judgment. A negative outcome in these cases is prone to have the effect of persuading the clinician that his suspicion is not warranted, and the common result is that the patient is deprived of the possible advantages of antisyphilitic treatment.

THE KOLMER MODIFICATION OF THE WASSERMANN TEST. The exhaustive investigations carried out by Kolmer¹ on the Wassermann test have resulted in the development of a technic which possesses a superior degree of sensitiveness to the methods previously in use.

¹ Series of thirty-two papers being published in the American Journal of Syphilis, beginning March 1 (January, 1919).

According to Kolmer,¹ the test is technically accurate and uniform, and, in addition, its performance is simple and economical.

Kolmer has indefatigably studied every phase of the complement-fixation test for syphilis. In this study he has devised many procedures for the performance of the Wassermann test in order to avoid pitfalls in technic, and, moreover, to increase the accuracy of the reaction. The following may be given as a brief summary of the technic of the test. The antigen employed is new and is highly sensitive. It is used in relatively large amounts. The tested serum is used in relatively large and varying amounts, 0.1 cc, 0.02 cc, 0.004 cc, 0.002 cc, and 0.001 cc. It is therefore a quantitative Wassermann reaction.

Method. The serum is heated for only fifteen minutes instead of thirty in order to remove the possibility of false reactions with the least destruction of reagin. A mixture of guinea-pig complements is prepared in such a manner as to increase sensitiveness to fixation by the antigen and the syphilis reagin. The test serum is mixed with the antigen for a brief period before the addition of complement. A primary incubation of eighteen hours in a refrigerator is followed by ten minutes in a water-bath. A daily titration of the complement in the presence of the antigen is carried out for the purpose of securing a close adjustment of the hemolytic system to a refrigerator primary incubation. The reaction is read within three hours after the conclusion of the secondary incubation with the aid of a reading scale.

The clinical value of the Kolmer modification of the Wassermann test is reported by Schamberg and Klauder.²

They have employed the Kolmer modification of the Wassermann test in about 2000 instances, and have compared the same with the older three-antigen technic. As a result of this study, they formulate the following opinions:

The Kolmer method yields distinctly more sensitive results than the older method, being frequently positive when the latter is negative. It does not appear to give false positives in nonsyphilitic subjects, nor in patients who have been treated for syphilis. It appears to give an earlier positive in primary syphilis, the value of which will be readily appreciated. It is much slower than the older method to become negative under treatment, because it is more delicate in detecting minute amounts of reagin in the blood. By reason of this, it ensures to patients more adequate and protracted treatment. It harmonizes with the clinical findings better than the older method, which was notorious for many unwarrantable negative reactions. Its quantitative character permits one to better gauge the effect of antisyphilitic treatment. It likewise gives suggestive evidence in connection with the so-called "Wassermann-fast" cases. They regard the Kolmer modification of the Wassermann test as a most important advance, and one calculated to shed added light on the detection of obscure syphilis and in the ultimate determination of the effects of treatment.

¹ Standardization of the Wassermann Reaction, Journal of the American Medical Association, 1921, **77**, 776-779.

² The Medical Clinics of North America, November, 1921, W. B. Saunders Co.

A New Method of Staining Spirochetes. Noguchi¹ states that in the case of *Spirocheta pallida* silver impregnation of tissues gives inconstant results, and films from fresh material fixed in methyl alcohol take a pale stain with Giemsa solution and none at all with other aniline dyes. In the method he advises *Spirocheta pallida* can be stained very distinctly, not only with Giemsa solution, but also with basic dyes, such as gentian violet and fuchsin.

A buffer solution containing formaldehyde which contains part of a formaldehyde solution in 9 parts of phosphate buffer solution (88 parts of M/15 Na_2HPO_4 +12 parts of M/15 KH_2PO_4 (ph 7.6) 9 parts of this solution are added to 1 part of commercial formaldehyde solution is used as fixative, the scraping or tissue emulsion being suspended in a small amount of the buffered formaldehyde solution and the mixture allowed to stand for at least five minutes (the longer the fixation the better the results; the organisms remain well preserved for at least two or three weeks). Thin films are made on clean slides, dried in the air, the film surface is flooded with a saturated alcoholic solution of gentian violet or fuchsin, or with Sterling's solution of gentian violet such as is used for Gram's stain, and the slide is almost immediately washed in running water and air dried. If the amount of material available is very small, a drop of the fixative (from a capillary pipet) may be put on a slide and a drop of the exudate added. The mixture is allowed to stand for five minutes or longer (protected from evaporation) and then spread into a very thin film. The less blood serum present, the better the differentiation between the organisms and the background. If Giemsa solution is used for staining, the slides are left in the staining fluid for one hour, as usual. It may be mentioned that the organisms remain well preserved for at least two or three weeks in tissues fixed in buffered formaldehyde solution and may be teased out for dark field examination or for staining by the procedure outlined above. They take a more intense stain when teased out of the tissues.

Very excellent stained specimens of *Spirocheta pallida* are obtained from the above method. The procedure promises to be of practical value in the routine diagnosis of syphilis, when the dark field is not available. Moreover, the method is of considerable value in teaching when one wishes to demonstrate the treponema in the dark field. In this circumstance, a syphilized rabbit's testicle or any syphilitic infected material can be removed from the buffer solution, the surface scraped and the liquid obtained examined under the dark field. Large numbers of non-motile spirochetes are found.

The Demonstration of Treponema Pallidum by Regional Gland Puncture in Early Diagnosis of Syphilis. The early diagnosis of the chancre is of vital importance. In the 1920 review of PROGRESSIVE MEDICINE, the means to an early diagnosis of syphilis was reviewed. The practice of puncturing the regional lymph glands as an additional means to early diagnosis of syphilis is of considerable value.

Droop² gives his results of the use of this method.

¹ Journal of the American Medical Association, December, 1921, p. 2052.

² Dermatol. Ztschr., April, 1921.

In a series of 50 cases of primary lesions, he was able to demonstrate *Spirocheta pallida* in 29. In 4 of these cases the dark-field examination for various reasons was not carried out. In 2 cases the negative results had to remain negative. In 10 cases, owing to phimosis, it was not possible to come directly into contact with the primary lesion; and in 7 cases, owing to local treatment, it was not possible to find the organisms in the surface serum. In the series of 50 cases, regional gland puncture resulted in positive findings in 38 and in 12 resulted in negative findings. In 10 cases with phimosis, the spirochetes were demonstrated in 9 by means of gland puncture. In 5 cases in which the surface serum was negative, the gland puncture examination was positive. In these cases, after three examinations of the surface serum, the very first gland puncture resulted in the demonstration of the organism. Therefore, in 14 cases of the 50 the diagnosis was arrived at only by means of gland puncture.

THE WASSERMANN TEST PERFORMED WITH CHANCRE-FLUID AS AN AID TO THE EARLY DIAGNOSIS OF SYPHILIS. Klauder and Kolmer¹ report their results with the Wassermann test performed with fluid obtained from the surface of the chancre and point out its value as an additional aid to the early diagnosis of syphilis.

In a previous communication² they reported results of the Wassermann test performed with secretions, exudates and transudates in syphilis, and presented evidence which justifies the belief that there may occur at the site of syphilitic lesions a local formation of the complement-fixing antibody and that the Wassermann test when performed with fluid from these lesions may be of value in differential diagnosis.

Chancre-fluid was obtained by aspiration by means of a small rubber bulb attached to the end of a fine capillary pipet. An ordinary medicine dropper could be utilized for the same purpose. It was difficult, and in some cases impossible, to obtain the minimum quantity of fluid (0.2 cc) that is necessary to conduct the Wassermann reaction. In these instances, physiologic sodium chloride solution was added to the chancre-fluid to make the required amount. In most instances, however, the fluid was obtained thus: A few drops of physiologic sodium chloride solution were placed and mixed on the surface of the chancre. After remaining there a short time, the entire amount of surface fluid was removed in the manner already described. The procedure was repeated until the desired amount of fluid was obtained.

In employing this method, a fluid of unknown dilution is obtained. However, fluid obtained in this manner in one of their cases yielded a ++++ reaction in 0.03 cc, whereas the blood Wassermann reaction of the same technic yielded a negative reaction. A ++++ reaction in a high dilution of chancre-fluid is not remarkable, in view of the fact that a similar reaction may be obtained with 0.001 cc of syphilitic blood serum. They have obtained a ++++ reaction in this dilution of serum in all stages of syphilis and uniformly in the untreated secondary stage.

A positive Wassermann (++++) reaction was obtained with chancre-

¹ Archives of Dermatology and Syphilology, May, 1922.

² Journal of the American Medical Association, June, 1921.

fluid by the foregoing method in the case of twelve of fourteen chancres examined.

Positive reactions were obtained from chancres which were treated locally as well as from those untreated: The dark field was found negative as well as positive in the case group; secondary infection was absent in some cases and present in others. A clear uncontaminated fluid from the surface of the chancre is apparently not a requisite in obtaining a positive Wassermann reaction. It should be noted that conditions which cause the disappearance of spirochetes from the surface of the chancre and hence make the dark field examination negative, local treatment with a spirocheticidal drug and pyogenic infection of its surface, apparently do not inhibit the local formation of the Wassermann fixing substances. Moreover, it is important to note that a positive Wassermann reaction with chancre-fluid is obtainable before the reaction appears in the blood. This observation apparently excludes the hematogenous origin of the complement-fixing antibody and points to a local formation of these substances. Hence, there is apparently no objection to the presence of blood in the chancre-fluid (it is difficult to obtain a blood-free fluid).

In view of Klauder and Kolmer's study, the Wassermann reaction performed with chancre-fluid is of clinical value in the early diagnosis of syphilis. However, its only value is in the cases of chancre in which the dark-field examination of the lesion is negative and the blood Wassermann reaction has not yet become positive. Such an instance was reported in the foregoing study in which, in a patient with a chancre of seven days' duration which had previously been treated with a spirocheticidal drug, the dark-field examination was negative and the blood Wassermann reaction likewise. The Wassermann reaction with the chancre-fluid yielded a ++++ reaction. In the majority of such instances the chancres are probably of recent duration, since the blood Wassermann reaction is less likely to be positive in such cases. Although the blood Wassermann reaction may be positive in the first few days of the chancre, particularly when the test is performed with a cholesterolized antigen, it may not become positive until just before the appearance of the secondary eruption. On the other hand, the shorter the duration of the chancre, the greater the likelihood of obtaining a positive dark-field examination.

The only objection to the method of performing the Wassermann test with chancre-fluid lies in the difficulty in obtaining sufficient fluid. Nevertheless, this method has a place in the laboratory diagnosis of chancre, particularly in that type of case of which mention has already been made. The method is not advocated in lieu of the dark-field examination, nor should a negative reaction, particularly when performed with a diluted fluid, be taken as conclusive evidence that the sore is not a chancre.

Klauder and Kolmer state that a more practical application of performing the Wassermann test on chancre-fluid would be to conduct this test with the fluid in which there was as much blood as it was possible to obtain from the surface of the chancre. Since the chancre surface

can easily be made to bleed, a bloody chancre-fluid would not be difficult to obtain. The test performed with such a fluid would include the local complement-fixing antibodies as well as those present in the blood. If a plentiful amount of blood is obtained, the Wassermann test with this fluid may serve in lieu of the Wassermann test of blood obtained by venipuncture.

An Analysis of 2100 Chancres. Gibson¹ reports clinical observations made upon 2100 genital and extragenital chancres in the males.

The sore was multiple in 23 per cent of cases. The diameter of the initial lesion varied from that of a pinhead to that of a crown piece. Those of larger size were usually found on the shaft of the penis or on the pubis. The shape, unless the sore was secondarily infected, was regular, and was either circular or oval. The sores were usually not tender. Enlargement of lymphatic glands was sometimes characteristic. A very important and absolutely diagnostic feature when present was the condition known as non-inflammatory edema. Among the genital chancres in the series, 47.2 per cent were papuloerosive, commencing as papule, rarely seen at this stage but only, as a rule, when the surface had become abraded; 19.4 per cent were granulating, appearing on the skin of the penis or scrotum or on the pubis; 1.5 per cent were abrasive, usually appearing on the glans penis; 6 per cent papuloulcerative, occurring in the preputial sac; 0.9 per cent were phagedenic, situated in the coronal sulcus or on the glans penis, especially under a long foreskin; 2.1 per cent meatal, usually involving only one side of the fossa navicularis and markedly indurated; 20.3 per cent were a primary sore with phimosis, with induration felt on palpating the sore and the non-inflammatory edema imparting a violaceous color to the overlying and surrounding parts, especially well seen at the tip of the phimosed prepuce. Among the extragenital chancres, that of the lip (27 cases) was the most common, and was of the papulo-erosive type, with appreciable surrounding induration. Painless enlargement of the submaxillary gland on the affected side was always present. Chancre of the tongue (3 cases) occurred on the dorsum, was clearly oval with surrounding induration, and of erosive type. Chancre of the tonsil (2 cases) showed marked, painless adenopathy on the same side of the neck, both cases being of the ulcerative type. Chancre of the eyelid in the only case seen involved the margin of the upper lid near the inner canthus and was of ulcerative type. Chancre of the fingers occurred in 4 instances, in 3 of which the condition involved the margin between the nail and the skin; the fourth had a large bulla involving the whole of the terminal phalanx of the right forefinger in front of, and at the sides of, the nail. Chancres of the other skin surfaces (11 cases) were all of the granulating type.

A Comparative Study of Syphilis in Whites and in Negroes. An interesting study of 1843 cases of syphilis, of which 60 per cent were colored and 40 per cent were white patients, has been made by Zimmermann.² Of these cases, 596 were white males, 521 colored males, 297 white females and 429 colored females. It was found that extragenital infection is

¹ Medical Journal of Australia, February, 1922.

² Archives of Dermatology and Syphilology, July, 1921.

relatively infrequent in the negro. The author is inclined to agree with Reasoner, who suggested that there exists in the negro, as in the rabbit, a tissue defense against syphilitic initial infection outside of the genitalia.

Of 27 extragenital chancres, only 5 occurred in colored patients. Of these, 3 were labial, 1 was lingual and 1 was on the abdomen. The age of infection is approximately two years earlier in the negro than in the whites. The maximum number of infections occurred in white males and females during the twenty-second and nineteenth years, respectively; among the black males and females in the twenty-first and seventeenth years, respectively.

Secondary syphilis in the negro is characterized by marked polyadenitis, by frequent and severe osteoarthritic symptoms, by the frequent and severe osteoarthritic symptoms, by the frequency of iritis, and by the high incidence of follicular and pustular syphilides. A striking racial peculiarity is the frequent occurrence of the annular papular syphiloderm. Bone syphilis is the most frequent lesion of tertiary syphilis in the negro, exceeding neurosyphilis, which in white patients comprised almost half of all late manifestations. Cardiovascular syphilis is more frequent in the negro, with an incidence of two to one in colored and white males, respectively. Stricture of the rectum and elephantiasis vulvæ are extremely common in the colored female. Leukoplakia is rare in the negro. Neurosyphilis is more frequent in white patients than in negroes. The negro is less likely to develop tabes or paresis, whereas the large group of unclassified cases of cerebrospinal syphilis is approximately of equal frequency in the two races. In negroes the disease is especially likely to manifest itself in the form of cerebral endarteritis. In respect to syphilitic infection, there exist inherited biological differences between white and negro patients. The negro develops intense reactions on the part of cutaneous and osseous structures, and is relatively free from tabes and paresis. In white patients, syphilis more frequently runs its course with skin manifestations slight or absent, but there is a greater tendency toward the eventual development of tabes or paresis.

Immunity Studies in Experimental Syphilis. Eberson¹ makes some valuable contributions to the study of immunity in experimental syphilis in rabbits.

Seven strains of *Spirocheta pallida* were studied from the standpoints of infectivity and survival and differential characters. Five of the strains were isolated from cases of latent syphilis—inguinal glands and semen—and the others were obtained from penile chancres.

Local immunity or, a better term, resistance to reinoculation in syphilis, has been established as a fact both experimentally and clinically. Information is lacking, however, in regard to the behavior of *Spirocheta pallida* which have been exposed to such influences as might logically be assumed to modify the course of an infection in the animal body.

The infectivity of *Spirocheta pallida* derived from old lesions was not diminished by prolonged residence in an infected focus. No correla-

¹ Archives of Dermatology and Syphilology, June, 1921.

tion seemed to exist between the period of incubation of the organism, on one hand, and the age of the lesion from which it was obtained, on the other.

Spirochetal content of lesions in the testicles was not correlated with the age of lesions and survival within the focus of infection. Fresh as well as old spirochetes did not appear to influence adaptation to environment as measured by survival or to affect the period of incubation. No differences were found to exist between different "lines of descent" made from a series of animals which represented transfers from actively developing lesions, and a series of generations which were derived from animals having old regressive lesions.

Elaboration of syphilitic antibodies appeared to be at a maximum late in the course of infection and predisposed to a condition of latency in which, despite the absence of lesions, *Spirocheta pallida* could be demonstrated. Far from preventing reinoculation with *Spirocheta pallida*, a state of resistance appears to favor the localization of organisms in tissues without giving rise to manifest lesions.

Inoculated testicles which remained negative for indefinite periods, presenting no lesions and proving negative by puncture, were found to harbor *Spirocheta pallida* capable of infecting other animals. The tendency for a condition of latency to occur was confined to certain strains or organisms, in particular those which had been isolated from latent sources in patients and rabbits.

In the absence of lesions, and with negative dark-field findings over a period of four or five months, *Spirocheta pallida* was isolated from apparently normal testicles which had previously been positive for spirochetes.

Sensitization phenomena may play an important part in the production of a certain kind of scrotal lesion resulting from autoinoculation of a normal testicle, from experimental infection of the opposite testicle in the course of involvement of the other, or from old testicular foci.

In another communication, Eberson¹ carried out some experiments based on the idea that syphilis may offer immunity phenomena analogous to, or similar to, those that are found in other infections which tend to assume the latent or carrier state. In order that the nature of the protective mechanism might be studied more effectively and be subject to control, a method of experimental infection was designed so as to permit the study of serum properties at different stages of the disease. These animal experiments were planned to supplement the data which might be gained from an investigation of serum taken from persons having latent syphilis.

A study was made of the spirocheticidal properties of different serums from patients known to have latent syphilis with the history of old as well as more recent infection and from experimentally infected rabbits. It was found that the blood serum from persons having latent syphilis had certain spirocheticidal properties. Rabbits were protected uniformly against infection with virulent *Spirocheta pallida* in combination

¹ Archives of Dermatology and Syphilology, October, 1921.

with such serums. Protective properties were found in the serums of asymptomatic persons with latent syphilis dating back from three to twenty-five years. It was also found in patients who had received treatment until the Wassermann reaction had become negative. There were a number of patients who had no history of infection, who had taken no treatment, and who had a slightly positive Wassermann reaction usually with cholesterol antigen.

Spirocheticidal activity of serums in latent syphilis is of such a character as to prevent the normal dissemination of *Spirocheta pallida* from a primary focus. Failure to inoculate rabbits with mixtures of serums and spirochetes was correlated with negative inoculations with the blood from such animals. In the experimental animal, spirochetolytic serum may be developed in the course of six months to one year after the infection. In the rabbit, as in man, protective substances are found at a time when the infection has attained a relatively latent state. The presence of these substances in given serums apparently depends on the stage of infection. When definite latency has been established, the serum appears to protect against experimental inoculation, whereas the serum from cases of early syphilis or those in which true latency has not been attained is not spirocheticidal. Spirocheticidal activity is essentially a function of times and depends on the degree to which the individual has elaborated and distributed the slowly accumulating antibodies.

Serums which were developed in rabbits by strains of *Spirocheta pallida* from latent sources manifested a wider range of protective properties, as shown by the inhibitory effect on heterologous, as well as homologous, strains. Serums from latent cases behaved similarly. Chancre strains when used for experimental infection were not capable of developing spirocheticidal serums for heterologous organisms in the few experiments which were attempted. A negative Wassermann reaction following antisyphilitic treatment may, or may not, go hand in hand with spirocheticidal activity of serums. Continued treatment which renders a Wassermann reaction negative does not appear to nullify any existing protective property of the given serum. By analogy with trypanosome and spirillary diseases and the carrier state of certain well-known infections, syphilis offers immunity phenomena which tend to explain latency on the basis of a blood immunity which is developed progressively from tissue immunity. The mechanism by which immunity in syphilis develops would seem to be an elaboration of antibodies commencing at the time when initial lesions are present and continuing as a progressive extension of local immunity from one group of tissues to another until the immune substances are absorbed by the blood stream. Latent *Spirocheta pallida* thus become innocuous for the host.

The presence of *Spirocheta pallida* at certain times in the human or animal body need not imply disease but rather a latent stage in which the spirochetes are able to survive in the immunized body. Failure to reinfect with syphilis means, from this point of view, the entry of spirochetes into surroundings which favor lodgment without setting up

visible lesions or manifestations. Immunity need not imply a condition which is incompatible with the life of a parasite. Latency, then, connotes a balance that has been struck in the individual between the antibodies and the invading parasites. The results of the experiments reported in this paper suggest that the serum from definitely established latent cases of syphilis may prove of therapeutic value.

Eberson has shown that there is an apparent production of immune bodies in a syphilitic infection. His work, however, does not show the nature of these bodies. There is a paucity of knowledge regarding the immunity in syphilis. Kolmer some years ago definitely proved the existence of agglutinins in the sera of syphilitics, other than this we have no definite knowledge as to the nature of any other antibodies in syphilis.

From a clinical visualization of syphilis it is logical to assume the production of immune substances. In some individuals infected with syphilis and untreated, the disease progresses into a spontaneously cured or latent stage in which there are no subjective or objective manifestations. The well-known work of Warthin supports the truthfulness of this statement.

I occasionally see individuals whom I have first seen years ago with unmistakable manifestations of secondary syphilis, who neglected all treatment, yet have a negative Wassermann and no demonstrable evidence of the infection. In all probability all of these patients do not later develop symptoms of tertiary syphilis. In such cases the production of immune bodies apparently plays an important role.

The work of Eberson recalls the one-time practice of the older syphilologist of injecting the sera of tertiary syphilitics into patients with acute syphilis as a part of the treatment of the disease. This method of treatment was not successful.

Neurorecidive. The following circular in regard to the importance of continued treatment of persons infected with syphilis has been issued by the Division of Venereal Diseases and sent to all State Venereal Control officers. The subject-matter of this circular is of sufficient importance to reproduce in its entirety.

"TO THE STATE VENEREAL DISEASE OFFICERS AND OTHERS. Recent medical literature contains many expressions of opinion by syphilographers, of this and other countries, regarding the high incidence and early onset of neurosyphilis. Another condition cited by them is that an increasing number of patients in the infectious second stage are being observed in the clinics. Many of the writers claim that too rapid sterilization and inadequate treatment are regarded as important contributory factors. Because of the seriousness of the problem and the diversity of opinion regarding the cause, the Service recently addressed a communication to a few of the leading syphilographers of this country asking for an expression of opinion on this important subject. The general opinion of the men written to is expressed as follows:

"While a certain amount of the apparent increase of neurosyphilis is due to the increasing use of spinal fluid examinations and other modern diagnostic methods, I think there is no question that the ineffective use of arsenicals plays a very important part in the most

undesirable tendency—the physician or health officer who is unable or unwilling to follow a syphilitic patient through a period of years, if not for life, should not attempt to treat the disease. Relapse is certainly the great outstanding fact of syphilis, and the so-called modern treatment has certainly not entirely done away with it. In particular, relapse in the nervous system and infectious involvement of the mucous membranes and genitalia are so alarmingly frequent under the inadequate use of arsphenamine that every agency which employs this drug in the treatment of syphilis should be thoroughly on the alert and equipped to detect the earliest manifestations of relapse.” (Stokes.)

“It appears to us that among the factors mentioned as probable causes, two are of paramount importance, *viz.*: (1) the tendency to undertreat; (2) the failure to interpret pathological findings in the light of the clinical picture.¹ To these we would add another of almost equal importance—the tendency to interrupt treatment by periods of rest. To our minds the treatment of all syphilis ought logically to be continuous rather than intermittent. Early neurosyphilis in the form of neuro-occurrences would be reduced to *nil* if this were done. Late clinical neurosyphilis might be equally easily avoided by the early routine use of spinal puncture and by adjustment of treatment to the pathological findings. We agree that the ‘sterilization’ treatment of syphilis, as exemplified by Pollitzer’s method, is distinctly dangerous from the point of view of neurosyphilis and that treatment should be directed toward building up the patient’s own resistance to the disease. Stokes’s² discussion of this problem in his paper ‘The Application and Limitation of the Arsphenamine in Therapeutics, deserves wider circulation than it has as yet obtained. The most crying present need of syphilotherapy is a standard treatment sufficiently elastic to be adapted to all types of cases, and sufficiently simple to be used by the average physician—unless a physician feels himself competent to carry out all the necessary procedures in the treatment of any given case, he should not attempt to treat it at all. Though many cases can be successfully dealt with by the general practitioner, he should realize that the appearance of any complicating feature is sufficient to warrant the transfer of the patient to a competent syphilologist.” (Keidel and Moore.)

“Syphilis of the nervous system probably begins in the first year of the infection. The number of cases corresponds roughly with the total number of cases of so-called late neurosyphilis. These statements are based on the following observations:

(a) “The number of early cases showing positive findings in the spinal fluid; (b) familial types of neurosyphilis; (c) biological evidence of a neurotropic strain of treponema; (d) persistence of the infection *in loco* as in aortitis, interstitial keratitis, etc.; (e) observation of patients who developed signs of early syphilis of the nervous system and who after many years died of paresis or other late degenerations; (f) no serological

¹ Fraser and Duncan: British Journal of Dermatology and Syphilis, July, August and September, 1921.

² Archives of Dermatology and Syphilology, September, 1920 (see Venereal Disease Division Abstracts, March, 1921).

evidence as yet exists showing normal spinal fluid in the early stage and its infection at a later period.

"Early neurosyphilis may manifest itself by obtrusive symptoms, by slight objective signs or be asymptomatic. Unless they are properly and thoroughly treated, these early infections may persist and cause late neurosyphilis.

"Every case of early syphilis should be treated intensively with arsphenamine and mercury given systematically in courses consisting of not less than eight injections of arsphenamine or its equivalent, neo-arsphenamine or silver arsphenamine, and fifteen injections of mercury; a minimum of two courses of the former and three of the latter should be administered. The treatment should be controlled by frequent Wassermann tests and a lumbar puncture made about six months after infection or earlier if indications should exist. Complete neurological examination should be made in order to detect early involvement of the nervous system and as a control for future examinations.

"The treatment outlined is not an insurance against the occurrence of neurosyphilis which not infrequently takes place during the active administration of the drugs. In such cases, intraspinal medication administered by one familiar with the proper technic may be a necessary adjunct. It is only by controlling early neurosyphilis that we can hope to prevent the later degenerations." (John A. Fordyce.)

It is of extreme importance, therefore, that physicians engaged in the treatment of syphilis carefully consider these statements and direct treatment toward the avoidance of the dangers outlined.

In inviting your attention to this matter the Service is not unmindful that many clinicians are engaged in the control of venereal diseases from merely the standpoint of health officers, and that available funds do not admit of intensive or long-continued treatment and are often used for sterilization purposes for public health protection. That there is danger to the public health in dismissing patients from treatment too early is seen in the claims of some observers who state that as larger numbers of infected individuals are brought under surveillance opportunity is afforded to observe an increased number of patients in the infectious second stage, which condition they believe to be due to inadequate treatment.

In the light of present knowledge regarding the subsequent danger to both the individual and community by ineffective and inadequate treatment, the Service urges that great care be exercised in recording case histories; in referring patients for intensive treatment to health centers or competent physicians to continue treatment when the clinic is unable to do so; and keeping cases of positive syphilis under proper observation until the period of danger for both the individual and the community has passed.

By direction of the Surgeon-General.

Reference is made in the foregoing pamphlet issued by the Surgeon-General to neurorecidive.

Neurorecidive, or neurorecurrence, is the occurrence in the earlier period of syphilis of a clinical manifestation of neurosyphilis, usually

meningeal in nature, with, or without, an involvement of a cranial nerve, and appearing in the course of treatment. More frequently, however, it occurs after insufficient treatment with arsphenamine and the cessation of all other treatment. At the time of the neurorecidive the spinal fluid shows a high pleocytosis, marked presence of globulin and a positive Wassermann. The serum Wassermann invariably remains unchanged. The spinal fluid at the beginning of treatment may be, and often is, negative.

Ehrlich explained the occurrence of neurorecidive upon an immunological basis. He pointed out that, "In these patients the greater part of the infecting organism has been destroyed by the powerful spirocheticidal action of the salvarsan. So rapidly has this been accomplished that the usual tissue immunity, which develops as a result of prolonged contact between parasite and host, is lacking, as a result a small focus of spirochetes in the tissues of the central nervous system, thus escaping the spirocheticidal action of the salvarsan, can develop in the susceptible host with great rapidity and severity."

Nonne¹ summarizes this phenomenon neurorecidive as follows: "Since the introduction of salvarsan therapy for neurosyphilis, paralysis of various cranial nerves are seen more frequently. This higher frequency is in part only apparent since more attention has been given of late to auditory and labyrinthine disorders. On the whole, however, it must be considered that salvarsan does activate old foci which, without salvarsan therapy, would perhaps have remained latent. Perhaps we are dealing in some instances with fresh infections of neurosyphilis, in other cases with a Herxheimer reaction."

The controversy regarding neurorecidive and the effect of arsphenamine upon the nervous system is not recent. It was started when Finger reported 9 per cent neurorecidive appearing in the course of treatment of 500 syphilitics (mostly secondary cases) with arsphenamine. He stated that during the same period he encountered only 5 cases of neurorecidive among 2000 patients treated with mercury and potassium iodide alone; that he had as many cases of neurorecidive among his 500 salvarsan patients as Mauriac encountered among 10,000 syphilitics in the course of thirty years. Finger² regarded neurorecidive as due to the action of arsenic upon the nervous system. This contention was repudiated by Benario,³ who published a monograph on the subject in which he made an analysis of 116 cases. This writer pointed out "that the phenomenon of neurorecidive is syphilitic in nature and disappears as the result of treatment; that it occurs also after treatment with mercury; that its occurrence to the extent of 94 per cent was in the early period of syphilis (within four months after the administration of arsphenamine, 40 per cent occurred in the second month); that it did not occur in the presence of preëxisting syphilitic disease of the nervous system."

The incidence of neurorecidive is variably quoted, the largest percentage being that of Finger. The occurrence of neurorecidive was

¹ Syphilis und Nervensystem, Berlin, 1915, 3d ed., p. 510.

² Med. Klinik, 1911, No. 46, p. 7.

³ Ueber neurorezidive nach Salvarsan u. Quecksilber Behandlung, München, 1911.

considerably more frequent in the earlier period of arsphenamine therapy than it is at present. This can be explained on the basis of the treatment in vogue at that time, which was to administer one or two massive doses of arsphenamine in accordance with Ehrlich's unfulfilled dream of *therapia sterilisans magna*. Such treatment we now know, in the light of experimental and clinical observations, is potent of harm, for, in addition to other reasons, it increases the likelihood of neurorecidive. Therefore, the incidence of neurorecidive is directly related to the method of treating acute cases of syphilis in vogue at different periods in the past, or that practised in different localities.

In a recent paper, Fraser¹ speaks of increase of neurosyphilis due to intensive treatment by arsphenamine in early syphilis after generalization causing rapid sterilization with loss of antibody protection for the central nervous system. He thinks that because of a lack of vigorous cell reaction, the spirochetes penetrate into relatively nonvascular areas of the central nervous system; that the central nervous system produces few or no antibodies and is dependent for protection on those produced as a result of the early reaction. As pointed out by Kaliski and Strauss,² this is only a restatement of the views of Gennerich, who holds that treatment, especially if insufficient, during the period of early dissemination hinders generalization of the spirochete and causes lack of immunity. Spontaneous cure of the early disease does not destroy this early ample immunological response, and the stronger the immunity the fewer the neurorecidives (meningitic or other). Local foci of spirochetes develop in the presence of a lesser immunity caused by insufficient treatment or when generalization is hindered. In other words, by means of insufficient early treatment or by a restriction of early immunity formation we have, instead of the *sterilisatio magna* of Ehrlich, a *sterilisatio fere completa*.

Neurosyphilis with Negative Spinal Fluid. The existence of neurosyphilis with negative spinal fluid is discussed by Solomon and Klauder.³ The only type of neurosyphilis in which it is generally recognized that the spinal fluid may be negative is that in which the disease process, so far as the central nervous system is concerned, affects almost solely the bloodvessels. Vascular neurosyphilis as represented by thrombosis, hemorrhage, cerebral aneurysm and arteritis obliterans are clinical diagnoses applied to this type of disorder. It must be added that in many cases in which the disorder is chiefly vascular neurosyphilis, the spinal fluid does show pathological changes. This depends on the amount of inflammatory reaction existing in addition to the vascular changes. There are, however, many other instances of neurosyphilis in which the spinal fluid may be negative. In this group, mention is made of tabes, cerebral gumma, cerebral syphilis of the type causing cerebral nerve palsies, Erb's syphilitic spastic paraplegia, syphilitic epilepsy, syphilitic paranoia and syphilitic dementia.

In the absence of spinal fluid findings as an aid to the diagnosis of

¹ American Journal of Syphilis, 1921, No. 2, 5.

² Archives of Neurology and Psychiatry, 1922, 7, 98-112.

³ Journal of the American Medical Association, 1921, 77, 1701-1706.

neurosyphilis, it is pointed out that the Argyll-Robertson pupil is one cardinal symptom which, when present, is strongly suggestive of a syphilitic involvement of the neuraxis. Other pupillary signs, such as marked irregularity, inequality and poor reaction to light, although suggestive of neurosyphilis, are of less diagnostic value, since they may be present in many nonsyphilitic conditions, as brain tumor, chronic alcoholism and arteriosclerosis. Other objective symptoms of neurosyphilis are reviewed.

Cases with clinical symptoms of tabes, but with normal cerebrospinal fluid, are discussed under three headings: (1) Cases of incipient progressive type; (2) cases in which the pathological findings in the spinal fluid have disappeared after treatment; (3) abortive tabes. The cases of the first group, namely, those which, although they show an entirely negative spinal fluid yet continue to have symptoms, are not at all infrequent and are considered as evidence of primary degeneration of the posterior roots and columns in the absence of an active inflammatory lesion.

In addition to the cases of tabes which have negative spinal fluids without treatment or after a very small amount is administered, there are cases which, as a result of intensive arsphenamine and intraspinal injections, become negative serologically but the subjective and objective symptoms of tabes remain unchanged.

The third group, variably termed abortive, "burnt out" or imperfect tabes, is of considerable clinical importance and may be reviewed in detail. This group includes those cases having no subjective symptoms and a paucity of neurological abnormalities which consists principally, if not entirely, of one or the other types of pupillary abnormality, the Argyll-Robertson pupil or irregular pupils which react sluggishly. The diagnosis of tabes may not be justified from the objective symptoms, at all events in a known syphilitic those symptoms manifest a neurosyphilitic involvement. The presence of a normal spinal fluid in this class of patients, previously untreated, points to a spontaneous cessation of the underlying neurosyphilitic process. In these cases, the pupillary abnormality probably represents a "neurological scar" of a former neuraxis involvement. The Argyll-Robertson pupil may be the earliest appearing objective symptom of tabes and may precede by many years the development of other symptoms of this disease. As previously mentioned, it is generally believed, although not definitely established, that the spinal fluid is persistently positive for many years prior to the development of frank symptoms of neurosyphilis. Therefore, in the light of present knowledge, the presence of an isolated pupillary abnormality, in the type of case under discussion, together with a negative spinal fluid, does not warrant the belief that this objective symptom is a forerunner of tabes or some other neurosyphilitic process. Moreover, the absence of subjective symptoms is further, but not complete, evidence against this assumption.

The statistics of Dreyfus are of importance in the discussion of the foregoing type. According to the observation of this writer, from 35 to 40 per cent of tertiary syphilitics with isolated pupillary abnormalities

have negative spinal fluids. Indeed, in Dreyfus' series of cases, the spinal fluid remained negative after provocative arsphenamine injections.

The realization of the existence of neurosyphilitics included in the third group of cases, discussed by Solomon and Klauder, is of considerable clinical importance. Not infrequently, in a clinical examination of tertiary syphilitics, one encounters divers types of pupillary abnormalities either as isolated neurological evidence of neurosyphilis or associated with other objective symptoms of neurosyphilis. The significance of such pupillary abnormality in a syphilitic, particularly in the absence of subjective symptoms, cannot be determined unless the spinal fluid is examined.

At a meeting of the Twelfth Congress of the German Dermatological Society¹ held at Hamburg, May, 1921, syphilis and spinal fluid were discussed by Professor Nonne.

Basing his statements on fifteen years of experience, he emphasized the necessity of making the diagnosis, prognosis and treatment of pathological spinal fluid depend on the exact control of (a) the number and species of cells, (b) spinal fluid pressure, and (c) globulin reaction. There is generally a slight rise in spinal fluid pressure in tabes and progressive paralysis. A distinct rise is seen in syphilitic meningitis. As to the lymphocytosis, 40 per cent of all syphilitic patients showed an increase of lymphocytes without showing any nerve symptoms. Nonne then pointed out differences in the development and course of tabes and progressive paralysis. He stated that progressive paralysis in exceptional cases can be cured (mentioning six of his own patients). The missing globulin reaction is the proof that cure has been effected—as the globulin reaction is seen only in true syphilitics. The Wassermann reaction was then discussed. This is positive in all cases of tabes and progressive paralysis—generally showing a stronger reaction in the latter. A positive Wassermann reaction is not in itself an indication for treatment. Several cases were mentioned and examples given to demonstrate this. Hemolysin reaction is not considered specific for syphilis by Nonne, although this reaction is seen in both tabes and progressive paralysis. In some cases the nervous system is attacked by syphilis as early as a few months after infection. The cerebrospinal fluid, as a rule, soon becomes involved. In spite of this, 60 per cent of patients with primary and secondary cases of syphilis with pathological fluid are cured. Normal cerebrospinal fluid does not prove the absence of syphilis. The speaker again emphasized the necessity of examining the cerebrospinal fluid in cases of isolated Argyll-Robertson pupil in syphilitic meningitis for exact diagnoses. As to the effect of treatment on cerebrospinal fluid, good results are obtained contrary to experience in progressive paralysis, in which the effect is only transitory. In spite of this, clinical symptoms may show rapid movement. The success of treatment will always depend mainly on the degree of infection and the strength of the defensive action of the system. In summarizing, Nonne cautions against treating diseases instead of patients, against trying reactions instead of considering the state of health of the infected person.

¹ Comment on the Hamburg Dermatological Congress, Hübner, *Deutsch. med. Wehnschr.*, September, 1921.

Nonne and Kyrle did not favor intraspinal treatment in neurosyphilis, whereas Gennerich, of Kiel, supported it.

Treatment of Neurosyphilis. Of the large number of recent papers on treatment of neurosyphilis, the following two are reviewed, since they are perhaps the most comprehensive.

In discussing treatment, Kaliski and Straus¹ point out that the proper care of a patient with neurosyphilis demands that the physician be conversant with modern laboratory diagnosis, equipped to evaluate the biological data, able to make a detailed neurological examination and especially capable of reaching a logical and practical conclusion after digestion of all the evidence.

They strongly believe in the efficacy of combined treatment in most forms of neurosyphilis, with certain notable exceptions. It is wise to adapt the treatment to the patient in the more chronic forms of neurosyphilis rather than to carry out a stereotyped plan designed to eradicate biological phenomena of the disease.

It is important to realize that neurosyphilis cannot be judged or classified by the outcome of biological reactions alone, but that of equal, often greater, importance are the clinical factors. Absolutely essential is a knowledge of the possibilities and limitations of various forms of therapy; also, a broad grasp of the patient as a complex human being with a psyche, not merely as a bundle of biological phenomena to be made negative. They protest against a form of therapy that often has a mortality of 20 per cent (intracranial therapy) with merely promising results, and against all extrahazardous and painful forms of therapy that do not offer more than a debatable chance for even prolongation of life, not to speak of cure.

Treatment of patient with acute cases—See plan, Group I.

GENERAL PARESIS. As regards general paresis, they are convinced of the futility of intraspinal and intracranial therapy, which they unhesitatingly condemn. Well-developed cases treated in groups for comparison did as well on one type of treatment as on another. All eventually succumb. The tendency of dementia paralytica to sudden remissions, even intermissions, must always be borne in mind. Patients with early cases frequently are astonishingly benefited by intravenous injections of arsphenamine, combined with injections or inunctions of mercurials, and exhibit prolonged remissions during which it is often quite impossible to detect any signs of mental aberration. In the absence of definite mental symptoms there has been a growing tendency to call these cases "serological" paresis, paresis sine paresia. In the hope of a prolonged period of remission, or that possibly what is commonly believed to be paresis, may prove to be a more hopeful cerebral syphilis, they practice persistent treatment of these cases.

LUMBAR PUNCTURE. They believe that on every patient with early syphilis lumbar puncture should be performed at least once, preferable at the end of the first year of treatment and earlier if indicated by clinical evidence of involvement of the nervous system. If the result is

¹ Archives of Neurology and Psychiatry, 1922, 7, 98-112.

negative, it need not be repeated, if treatment is continued until the third or fourth year. If then negative, in the absence of clinical signs of nervous syphilis, they do not repeat it (see the following plan). If positive, they do not repeat it oftener than once a year during the continuance of therapy. In latent cases or in late cases of syphilis with any suspicion of nervous or mental change, of course they perform lumbar puncture as a diagnostic measure. During treatment, they believe that a great deal of harm may be done by too frequent tappings. They are guided by the clinical symptoms and the blood reaction, reserving puncture for the completion of treatment. As therapeutic indications, they are guided first by the clinical symptoms and objective signs, to a lesser degree by the outcome of the tests.

INTRASPINAL THERAPY. Kaliski and Strauss state that a review of the literature has shown a growing tendency in this country to restrict intraspinal treatment to very narrow limits which has been largely due to the efforts of Sachs and his associates. In Europe, with few exceptions, there has been a general abandonment of intraspinal methods.

Plan of Procedure in Syphilis of the Central Nervous System.

GROUP I.

Cases requiring immediate and intensive treatment: Early cerebro-spinal syphilis at onset of or early in:

- Meningitis.
- Meningomyelitis.
- Meningoencephalitis.
- Cerebral and spinal endarteritis (fresh insult).
- Optic neuritis—advancing.
- Syphilitic epilepsy—earlier cases.
- Pseudotabes.
- Ophthalmoplegias.

Early tabes dorsalis—with acute symptoms, pains, crises, etc.
General paresis—with acute manifestations. Treatment—unless contraindicated:

1. Arsphenamine (or equivalent) 0.2 to 0.4 gm. every three to five days until symptoms are controlled, then 0.4 gm. every week—six to eight injections in each course. First course followed by treatment as in Group 2.
2. Mercury by deep intragluteal injections. Soluble salt every two or three days, alternating with above until symptoms demand less intensive treatment. Then follow injections by arsphenamine with weekly injections of insoluble preparations as in Group 2.
3. Iodides by mouth, if possible, rectally or intravenously otherwise.
4. Lumbar puncture for relief of coma, secondary hydrocephalus symptoms, root pains.

GROUP 2.

More chronic cases—later stage of Group 1. Cases with persistent biological reactions—general paresis:

1. Arsphenamine (or equivalent) 0.25 to 0.4 gm., once weekly or every ten days—six to eight injections followed by mercury.
2. Mercury, insoluble preparation every five days—or soluble preparation thrice weekly for two months or thirty rubbings.
3. Iodides by mouth, rectum or intravenously to point of tolerance for one month following mercury or alternating.
4. Sodium nucleinate intragluteal injections 0.3 to 1.0 gm. or more to induce febrile reaction—every three to seven days—in general paresis and occasionally in resistant tabetic or spastic cases.
5. Reëducation method of Maloney.
6. Symptomatic baths, massage, medicinal for pain, bladder symptoms. Repeat once or twice during the first year as indicated by benefit derived, the condition of the patient's excretory organs, morale, biological reactions, etc. Subsequently yearly or more or less often, gradually tapering off. See Group 3.

GROUP 3.

Late cases of tabes dorsalis, cerebrospinal syphilis, optic atrophy, spastic paraplegia and cases of Group 2 after three years:

No attempt to influence biological reactions, treatment mainly symptomatic and supportive.

1. Arsphenamine, 0.25 to 0.4 gm. every two weeks, not more than six injections in all; only if well tolerated.
2. Mercury by inunction or injection following No. 1.
3. Iodides by mouth, following No. 2.
4. Reëducation, method of Maloney.
5. Symptomatic, control of crises, bladder symptoms.

The treatment of neurosyphilis is discussed by Solomon.¹ He states that there is no possible routine treatment for neurosyphilis, even though we divide the cases into types, as syphilitic meningitis early or late, tabes, parësis or any other classification. Some cases do well on one kind of treatment, other cases do poorly on this same treatment but react well to another type. Others do not react well to any form of treatment that has yet been devised.

What we need above all else is a careful study of cases treated by different methods, treated by a combination of several methods, over a long period of time and carefully watched and controlled. From this material we may slowly be able to acquire some information that will be of value. The fact that X number of cases of tabes, treated by intraspinal injections or intravenous arsphenamine plus spinal drainage, show improvement in Y number of cases may have a slight, but not a

¹ Pennsylvania State Medical Journal, 1922, **24**, 236-241.

great, value. Many other factors must be known. What would cases giving poor results have done had another method been employed? How advanced were the cases? What was the general condition of the patient as regards his cardiovascular system and other systems, etc.? It is really surprising, in going over the literature upon the treatment of syphilis of the central nervous system, to see how little actual material is to be found.

In contrast to the group of cases of neurosyphilis which general treatment will cure or greatly improve, there is another group in which general treatment seems to be of little avail and in which intraspinal injections are of great advantage. Much stress has been laid upon this finding to the exclusion of a consideration of the real value of general treatment. This has led many investigators to feel that general treatment was not efficient in cases of neurosyphilis. The truth is that no one method can be considered the optimum for all cases but that where one fails another may succeed.

Solomon points out that in the treatment of neurosyphilis, one is not treating the spinal fluid, in other words a negative spinal fluid as a result of treatment is not necessarily a criterion as to the efficacy of the treatment. He mentions the frequency with which active neurosyphilis occurs with a negative spinal fluid. Again, in patients having a positive spinal fluid at the outset of treatment the spinal fluid may become negative and the patient does not improve. This is particularly true in patients with tabetic gastric crises, as a result of treatment the spinal fluid may become negative, yet the crises continue unabated. On the other hand, some patients may make excellent and prolonged clinical improvement despite an unchanged spinal fluid.

The best method is the method which produces results in the given case. We must depend still to a large extent upon the trial and error method. We must see what happens and then see if we can do better. Undoubtedly, we can do much for our patients, undoubtedly we can do more than we are doing, particularly if we are optimistic enough to continue week after week, month after month, and even year after year, treating the same patient intensively and unceasingly. Even the most ominous-appearing cases, as general paresis, will often do exceedingly well.

Solomon states that he is optimistic about the treatment of neurosyphilis. Not all patients can be helped. But many cases which are considered incurable can be greatly benefited by intensive and prolonged treatment of the proper sort. We have at our disposal the means with which to help many patients with neurosyphilis, including meningitis, tabes and paresis. Many of these cases are considered hopeless because of inadequate handling.

Bismuth in the Treatment of Syphilis. The recent French literature contains reports concerning the use of bismuth in the treatment of syphilis. The drug is used in the form of tartrobismuthate of sodium and potassium and is dispensed in an oil-suspension or an aqueous solution. The latter is known as Luatol, which is an aqueous, glucose and neutralized solution of soluble tartrobismuthate of sodium and

potassium. The aqueous solution is recommended because it is far less painful when injected and is said to be more efficacious.

Luatol is dispensed in ampoules in a strength of 0.10 gm. or 0.20 gm. of tartrobismuthate of sodium and potassium per cubic centimeter. Treatment consists in intramuscular injections administered in doses of 0.20 gm. every two days or 0.30 gm. every three days, so that the patient receives 2.0 and 2.5 gm. in a first series of three or four weeks.

Animal experiments with the salts of bismuth were first conducted by Sauton and Robert¹ in 1913, and more recently by Sazerac and Levaditi.² The substance originally used by Sazerac and Levaditi was prepared by Cowly's³ method. For therapeutic uses in man, the precipitate obtained by Cowly's method is washed and dried, instead of being dissolved in alkali. The original compound contains 50 per cent bismuth, the modified preparation 55 per cent. Subcutaneous injections of the water solution are supported well by rabbits. The intravenous route is more toxic. Oily suspensions are less toxic than water solutions. Syphilis in the rabbit is not affected by administration of bismuth by mouth, but is checked if the compound is given by the anus. Local applications appear to be effective, and suggest preventive possibilities in man. Pastes are more active than powders. Syphilis in the rabbit may be affected by other bismuth compounds (ammoniacal citrate, soluble lactate, subgallate and oxyiodogallate). For use in man, the best compound appears to be the tartrobismuthate of sodium and potassium. It is stable and but little toxic if injected subcutaneously or intramuscularly. *The intravenous injection is positively contra-indicated.* In man and animals, the antisypilitic action of bismuth is comparable to that of the best substances known. It acts more effectively and deeply than mercury, although less rapidly, in certain cases, than the more powerful arsenicals. Water solutions produce pain and local reaction. Intramuscular injection of the oil suspension is best. The authors have applied the method to 5 cases of syphilis in man (1 primary, 2 primary and secondary combined and 2 tertiary). The results were favorable in all 5 cases. Their conclusions are reserved until the method has been sufficiently tested. The tartrobismuthate appears to be of simpler structure than some of the arsenical compounds. The bismuth preparation does not require the presence of an integrally active molecular group.

Fournier and Guenot⁴ report their observations upon the use of bismuth salts in 150 cases of syphilis. Most of these were under observation for periods of two to five months. The action of bismuth on sypilitic lesion is thus summarized: Spirochetes disappear from the surface of the chancre usually after the second injection. Small erosions heal within a few days, average chancres in ten to fifteen, and larger ones in twenty to thirty days. Cicatrization takes place perhaps a little

¹ Action du Bismuth sur la spirilose des poules, Ann. de l'Inst. Pasteur, 1916.

² Action du Bismuth sur la syphilis et sur la Trypanosomiasse du Naga, Acad. des Sciences, 1921, No. 22, p. 1391.

³ Chemist and Druggist, 1913, 82, 212.

⁴ Bull. Soc. franc. de dermat. et syph., 1921, No. 9, p. 475; Ann. de l'Inst. Pasteur, 1922, 36, 14.

more slowly than with arsenical preparations, but the induration of the chancre and the adenopathies seem to disappear more quickly. Mucous patches and genital erosions heal also after 1 or 2 injections. A simple roseola completely fades away, usually in five to ten days. Other secondary symptoms disappear also after a few injections. Several patients who had had relapsing secondary lesions for years, in spite of arsenical and mercurial treatment, were successfully treated by bismuth.

Very good results were obtained in syphilis and in osteoperiostitis. Gumma and leukoplakia responded less quickly or completely to treatment, and a case of general paralysis was not affected at all. When patients are treated before the appearance of secondary lesions the Wassermann seldom becomes negative after the first series of injections; this result is usually obtained only after two to four months. In cases first treated during the secondary period, the reaction generally remains completely positive during the first month, and decreases in intensity thereafter. Seven cases became weakly positive and 7 negative out of a total of 16 regularly treated for three months. Fournier and Guenot used for the most part an insoluble tartrobismuthate in oily suspension. Other preparations appeared to give about the same results. The injections should be made in the muscles, as subcutaneous injections are too painful. Bismuth cannot be used in increasing doses, like arsenic, on account of the risks of stomatitis when doses of 40 cm. are reactive. Not more than 30 cg. should usually be given in 1 dose, and 10 to 20 cg. is safer for weak or aged patients. From 2 to 3 gm. may be injected during the first month and a weekly dose of 20 to 30 cg. after this. In the course of 1500 injections no serious symptoms or signs of intoxication were noted. On the other hand there is sometimes a painful local reaction at the point of injection and stomatitis occurs fairly frequently. It is usually benign, however, and disappears under the influence of antiseptic mouth washes. The presence of bismuth can be detected in the blood and cerebrospinal fluid. It is eliminated in the saliva, bile, feces, sweat and urine. Bismuth appears to be a valuable antisyphilitic agent, especially as regards the rapidity and permanent character of its action on contagious lesions.

One of the chief disadvantages of the drug, according to Tixier Hudelo and Milian,¹ is the fact that it frequently causes ulcerative stomatitis and albuminuria. It has been pointed out, however, that this is particularly liable to occur after the use of the oil suspension of the drug in view of the uncertainty of absorption, and considerably less liable to occur after the use of the soluble form of the drug.

French medical opinion seems to be favorable to the use of tartrobismuthate of sodium and potassium. Most writers particularly mention its value in syphilitic patients who have become refractory to mercurial or arsenical medication.

Modern Conceptions of the Treatment of Syphilis. The present status of the treatment of syphilis is reviewed by Schamberg.²

The most powerful chemical weapon which we possess in treatment of syphilis is arsphenamine. Mercury is a remedy of value but occupies a position of secondary importance.

¹ Soc. Méd. des Hôp. de Paris, December, 1921.

² Pennsylvania State Medical Journal, January, 1922.

The therapeutic value of a chemical compound in any infectious disease is related not only to its destructive influence on the parasite but likewise to its tolerance by the body cells. Arsphenamine is tolerated by the white rat in about 100 mg. per kilo of body weight; mercury is tolerated by the same animal in about 2 mg. per kilo of body weight. Mercury is therefore fifty times more toxic than arsphenamine. Mercury, by reason of its much greater affinity for the body cells, can be administered only in small doses as compared with arsphenamine.

Mercury in the highest dosage that can be tolerated by man in a single or severe succeeding administration, fails to effect a disappearance of spirochetes in external lesions. Whereas, neoarsphenamine, in as small amount as 0.05 gm., injected twice daily for two days, invariably led to complete disappearance of the spirochetes.

It has been stated that mercury is therapeutically effective through the increase it causes in the production of antibodies. In all probability arsphenamine and mercury both act similarly as direct spirocheticides, although mercury is much the weaker.

Both the arsphenamine and mercury, even in therapeutic doses, bring about certain perceptible structural changes in organs. The liver is the organ dominantly vulnerable to arsphenamine and the kidneys to mercury. Ordinarily, the damage is readily repaired and functional and structural integrity of these organs is restored, as occurs in the repair of organic injuries after certain infectious diseases. When, however, danger signals are ignored and ruthless treatment given, irreparable damage may at times result.

"606" (arsphenamine) has several important advantages over "914" (neoarsphenamine). It is a more uniform product. Neoarsphenamine is a less stable product than arsphenamine. It undergoes oxidation more rapidly, both in solution and in the dry state, and under certain conditions may deteriorate after long aging.

Despite these disadvantages, neoarsphenamine has come into constantly increasing employment. The main reason for this is that it is better tolerated by the patient. It is, therefore, less liable than arsphenamine to give rise to seriously disturbing reactions which may interrupt the course of the patient's treatment. But above all, it is distinctly the safer drug. The mortality after neoarsphenamine is decidedly less than after arsphenamine.

The therapeutic activity of arsphenamine is 1.74 times greater than that of neoarsphenamine. Arsphenamine is 2.4 times more toxic than neoarsphenamine. Therefore, neoarsphenamine has a higher therapeutic index than arsphenamine. Sodium arsphenamine appears to be inferior to arsphenamine and neoarsphenamine.

There are many formulated standards for the treatment of syphilis, but there is no standard. The greatest divergence of opinion attaches to the dosage and frequency of administration of arsphenamine and neoarsphenamine and the character and chronological relationship of the associated mercurial treatment.

Many physicians administer a dose of 0.4 to 0.6 gm. arsphenamine or 0.75 to 0.9 gm. of neoarsphenamine weekly, and in conjunction the use of mercury in the form of the soluble or insoluble injections or inunctions.

This is ordinarily continued for about six weeks, after which a rest of a month is allowed and later a second, third or fourth course given at proper intervals.

Pollitzer, of New York, has advocated three successive daily doses of arsphenamine, 0.4 to 0.6 gm., or 0.9 gm. neoarsphenamine followed by weekly intramuscular injections of salicylate of mercury for eight weeks. Then a two months' rest and a repetition of the treatment, and a third course after another two months' rest.

A method much in vogue in France is the weekly administration of progressively increasing doses of one of the organic arsenicals, beginning with 1 decigram and then increasing to 2, 3, 4, 5, 6, etc., in order to avoid complications due to hypersusceptibility to the drug.

Still another method is the straight arsenical treatment, as employed, for instance, by Leredde. Injections of neoarsphenamine are employed at weekly intervals until the Wassermann becomes negative.

Is there any light that can be thrown upon this confusion of advice? Fortunately, some little illumination is at hand. Spiethoff¹ has carefully worked out a "therapeutic unit," consisting of the number of grams of the arsenical or of mercury, necessary to prevent symptoms and to keep the Wassermann negative in primary seronegative syphilis, and, with this as a criterion, has compared several different methods of treatment in a large number of cases. He concludes that the treatment with early very small doses of arsphenamine gives results inferior to those produced by larger doses; furthermore, that the combined arsphenamine and mercury treatment achieves better end-results than the straight arsenical treatment, although, owing to a complicating factor, he still reserves his opinion on this point.

For some years I have, in a large clinic, given straight arsenical treatment, as a result of which I would express the following opinion: It is possible to cure virtually all cases of primary seronegative syphilis by the use of the arsphenamines alone. A high percentage of cases of secondary syphilis can be cured by weekly injections of arsphenamine or neoarsphenamine alone, although some cases run on with a persistent positive Wassermann reaction. Ten injections of arsphenamine appear, in general, to be equivalent to about fifteen injections of neoarsphenamine. The majority of patients will tolerate two doses of 0.9 neoarsphenamine for two weeks and then once a week for eight or ten weeks or longer. That cure can be achieved by straight arsenical treatment is evidenced by the history of one of our patients who developed a fresh attack of syphilis two years after the first attack. All of the criteria of a reinfection were rigidly satisfied.

What are the advantages and disadvantages of a straight arsenical regimen? To my mind there is a decreased liability to exfoliative dermatitis and to jaundice and other liver complications. In 15,000 intravenous injections of the organic arsenicals we have observed only three or four very mild cases of dermatitis and about a half-dozen cases of jaundice, all of whom recovered. In certain clinics, where arsphenamine and insoluble mercury injections are conjointly given, the incidence of these complications has been much larger.

¹ München. med. Wchnschr., June, 1921.

The vigorous associated use of mercury may readily irritate the kidneys and lessen the rapidity of elimination of arsenic.

I have no doubt that a combined arsenical and mercurial treatment is more therapeutically active and more rapidly curative than the sole use of one or the other drug; but I am equally convinced that unless certain safeguards are followed, an increased risk attaches to such treatment. I am opposed to the use of intramuscular injections of insoluble mercury given during the regular arsenical treatment, for accumulation of mercury in the gluteal deposits invariably takes place. The safest efficient method of employing mercury with arsphenamine is by inunction, and even here the rubbings should not be too intensive. With the joint treatment one can afford to use both the arsenical compound and mercury in more moderate dosage than when they are employed alone. I see no objection to giving small doses of mercury by mouth in conjunction with neoarsphenamine. This would represent a combination of the old treatment with the new.

Primary Syphilis. There has been a change of sentiment with respect to the security of a single course of treatment in the hope of aborting the infection. Mulzer found that even in seronegative primary lues, recurrences have taken place after thirty injections of soluble mercury, or ten of insoluble mercury, combined with eight intravenous arsenical administrations.¹ It is now suspected that generalization of infection may take place even though the Wassermann does not yield a positive reaction. Second and, at times, third courses are, therefore, advised even in primary seronegative lues.

I would counsel the employment of two injections of neoarsphenamine 0.9 gm. or arsphenamine 0.3 gm. twice a week for two weeks, then once a week for six weeks. At the same time, inunctions of 50 per cent mercurial ointment on alternative days, with a continuance of the rubbings until thirty have been used. After a rest of three weeks the entire course should be repeated. Another rest of three weeks should then be given and, if the Wassermann is negative and no evidence of syphilis exists, mercury by mouth as an added security should be taken three weeks out of four for a year. There is no objection to the employment of three or four courses of mercurial injections or inunctions instead of the treatment by mouth. Oral treatment, however, as an adjunct to the intravenous arsenical medication is not to be held in my opinion in such contempt as many are disposed to regard it.

It is not at all uncommon for us to find ancient luetics, treated years ago continuously with mercury by mouth, who have negative Wassermann reactions and are free of any evidences of syphilis. To be sure, cases of a contrary character are likewise observed, so that reliance solely on mercury at the present time would be most unwise. As an adjunct, however, to the early use of a powerful arsenical spirocheticide there should be an increased probability of a successful outcome.

Secondary Syphilis. To ensure complete extermination of spirochetes that have been profusely deposited in all organs and tissues of the body, three courses of the arsenical and mercurial treatment above referred to

¹ München. med. Wehnschr., June, 1921.

should be given during the first year and two during the second. In the intervals, mercury may be taken by mouth. It may be disappointing to some physicians that the trend of medical judgment is to extend the period of treatment. It must be realized, however, that it is far better, in the interests of the patient, that he should receive medication in excess of that which is necessary to cure, rather than that it should fall just short of the required amount.

There has been too much tendency to regard a negative Wassermann as evidence of the extinction of the infection. All biological tests are fallible and the great weakness of the Wassermann reaction is in the negative outcome. Not infrequently the Wassermann is negative in the presence of a circumscribed tertiary cutaneous lesion or in certain cases of visceral syphilis. The delicacy of the technic often means the difference between a negative and a positive. Early negative Wassermans after brief treatment should be disregarded as an index to further treatment. Every patient must receive an irreducible minimum of treatment, otherwise his future is uncertain. Wassermann tests should be taken from time to time for two years, and mercurial treatment should be continued even in the face of a negative outcome.

Tertiary Syphilis. The treatment of tertiary syphilis is based on rather different principles than that of lues in the earlier stages. Intensive treatment is ordinarily to be avoided, for rapid cure is unlikely and the administration of powerful remedies may do actual harm. Moderate doses of neoarsphenamine may be given and followed by small doses of mercury. The iodides, while not directly spirocheticidal, have an admirable influence in this stage. It is true of syphilis generally, but with special applicability to the tertiary leutic, that the patient must be treated as well as the disease. Sometimes the suspension of specific medication and the devotion of attention to the correction of digestive, nervous or other disturbances will be of great advantage. Patients over fifty years of age, who have no evidence of active visceral or neurosyphilis, should not be vigorously treated even though they have a strongly positive Wassermann reaction. Many such patients may live to a ripe old age, but injudicious intensive treatment may abbreviate their lives. At all times, during the course of treatment, careful attention should be paid to danger signals, such as renal irritation, jaundice, itching or cutaneous eruption. Moreover, treatment should not be pushed at the expense of the patient's physical well-being.

No crystallized formula of treatment can be adapted to all cases; in no disease is individualization more essential.

The Treatment of Visceral Syphilis. The treatment of visceral syphilis is discussed by McCrae.¹ In the treatment of visceral syphilis there are two parts to the problem. In the first place we have a chronic spirochetal infection, contracted some time before, which has become chronic in the strongest sense of the word. Second, we have the changes which have resulted in the tissues as a result of this infection. When we treat visceral syphilis what should we have in view—to try to correct both

¹ Pennsylvania State Medical Journal, January, 1922.

conditions or to devote our efforts to one more than the other? Naturally the ideal is to correct both if this is in our power.

With our present knowledge it is not possible to speak with any certainty as to the proportion of cases in which, as the result of treatment, the body is entirely freed of spirochetes. It is to be remembered that visceral syphilis only is under consideration. There are cases in which, so far as the evidence goes, it is done. There are others in which it has not been done. The distinction must be kept clearly in mind between an infection with the spirochete and the clinical manifestations of the disease syphilis. A man may harbor the spirochetes and yet be in perfect health without any clinical signs of syphilis. There seems no reason to suppose that serological tests are always necessarily positive when the tissues contain spirochetes, for the organisms may lie quietly, neither troubling nor being troubled by the tissues of the host. Years later, for some reason, the spirochetes may be stirred into activity and clinical syphilis become evident.

With syphilitic infection of the aorta, McCrae believes that as the result of treatment one cannot be certain of having killed all the organisms. Treatment may influence the process in the tissues for the better, but that is all, and the disease is likely to advance sooner or later if it is once established. In the aorta, it is difficult to say how much this is due to the spirochete and how much to the changes in the vessel itself. In the liver, a contrary state of affairs exist. A syphilitic process there shows little tendency to recur if it is once energetically treated. In all cases, the time element is important. Even in the aorta, with early recognition and prompt treatment, much immediate benefit may result, but the end-results are not very satisfactory.

The matter may be summed up by saying that in treating visceral syphilis we hope to kill out the infection, but it is wiser to regard it as being latent and not absent. Certainly this is the safest attitude for the welfare of the patient.

McCrae believes that the most plausible explanation of the iodides in causing a resolution of a syphilitic process is that the drug saturates the unsaturated fatty acid radicals which inhibit autolysis. The ferments then become active, autolysis follows and the necrotic tissue is absorbed. In so far as the tissue changes are concerned, the use of iodide is the most important factor. This, however, does not mean any influence on the spirochetal infection.

Syphilis is particularly a vascular disease and this plays a large part in the visceral lesions, illustrated best, perhaps, in the nervous system. The specific treatment has little, or no, influence on the vascular changes, a point to be kept in mind in considering the possibilities of therapy.

As to how far the Wassermann test should be regarded as an indication for the duration of treatment, McCrae believes that it should occupy a subordinate place and not to be considered too seriously. The reaction may be negative, with well-marked signs of syphilis. Another point is the great variation in the reaction which may be shown from time to time. A more important argument for treatment without too much attention to the Wassermann test is the fact that in every case one is dealing with a chronic infection of which we can never be certain that

it has been terminated. In other words the infected individual should be treated for the rest of his life at intervals, no matter how well he may seem to be and no matter what his serum reaction shows.

As to the choice of the arsphenamines or mercury in the treatment of visceral syphilis, McCrae states that if he were to choose one or the other, his choice would be mercury. However, both should be given. The dose should always be small to begin with and increased gradually, if at all. One reason is that in all cases of visceral syphilis there is a strong chance of the aorta being involved, and it is well recognized that in these cases there is definite danger from the use of the arsenic preparations. In syphilis of the liver, the use of the arsenic preparations is contraindicated. The danger of a severe reaction, resulting hepatic damage and perhaps death is considerable. Within recent times, there has been an unusual number of patients showing evidence of hepatic injury after the administration of the arsphenamines.

The use of mercury demands a thorough study of the condition of the kidneys before its use is begun (although the danger of renal damage does not seem to be great) and a careful watch over the condition of the blood. There may be a rapidly increasing anemia if mercury is given carelessly.

The actual treatment may be begun by giving arsphenamine or neoarsphenamine (except in hepatic syphilis). In general, it is well to give comparatively small doses, say 0.2 gm. arsphenamine or a corresponding relative amount of neoarsphenamine. The dose may be repeated weekly for four or six weeks. It is better to give arsphenamine first and mercury later. If the condition is serious, it may be advisable to give a larger amount of arsphenamine after the first dose, but it is wise to increase the amount gradually. If there is any question as to the possibility of danger from arsphenamine, mercury should be begun at once, otherwise after the course of arsenic injections. In hepatic syphilis mercury should be given. McCrae's choice of the preparation of mercury is for administration by inunction. A course of twenty to thirty inunctions should be given, six a week. Oral administration should not be employed in the early stages of treatment, but after mercury has been given thoroughly by inunction or injection, this may be employed with advantage.

McCrae advises a course of arsphenamine or neoarsphenamine injections, followed by a series of mercurial inunctions. After an interval of two weeks, both should be repeated. Following this, a period of three months may elapse before both are repeated. In the interval, mercury may be given by mouth. The mercury and chalk powder in doses of 1 or 2 grains three times a day is an excellent form, or the bichloride with iodide or the protoiodide.

The administration of iodide may be begun at once and continued steadily for some time. If there is any question as to the duration of administration, it is well to continue it. The dose must be adjusted to the patient. As a rule moderate doses are usually sufficient and need not go above 30 to 40 grains a day. In hepatic syphilis it seems that the smaller amounts are best and 30 grains a day are usually sufficient. But the problem should be settled for each patient. In syphilis of the

nervous system, massive doses are advisable. Iodide should be given steadily, or with very short intervals, when it is discontinued, for a period of four to six months, and after this for at least one month in three. Some patients who have difficulty in taking small doses are perfectly comfortable if the dose is considerably increased. As to other measures, they must be employed when occasion demands. One point is worthy of note—attention to the condition of the blood. This should be watched and proper treatment carried out for anemia. It is well recognized that in some patients the administration of antiluetic treatment results in a rapid improvement in anemia if present, but this should not be taken for granted.

The Treatment of Antenatal and Congenital Syphilis. The important problem of antenatal and postnatal syphilis is comprehensively discussed by Fordyce and Rosen.¹ As is well known, syphilis is the most frequent cause of abortions and stillbirths, statistics ranging from 20 to 50 per cent. Williams, in his series of 10,000 pregnancies, holds the disease responsible for 26 per cent of the fetal deaths between the end of the seventh month of gestation and the two weeks prior to delivery. Routh arrived at about the same figures in his computations, stating that, in urban populations, 25 per cent of the miscarriages and stillbirths are due to this infection. Fordyce and Rosen found that from 25 to 35 per cent of the patients referred to them by maternity hospitals, because of a strongly positive Wassermann reaction with cholesterinized antigen alone give a negative reaction with all methods when they report several weeks after delivery and remain negative on repeated examination.

They emphasize the importance of treatment early in pregnancy to prevent abortions or miscarriages and to ensure the birth of a healthy nonsyphilitic infant.

In the treatment of syphilitic women who are pregnant, they follow a regular plan of giving from 6 to 8 injections of arsphenamine or neoarsphenamine, the former in doses of from 0.3 to 0.4 gm., the latter in doses of from 0.45 to 0.6 gm., at weekly intervals, together with mercuric salicylate or mercuric chloride, 1 grain once a week from 12 to 15 injections. As a rule, pregnant women tolerate the treatment well and without by-effects. When the mercurial injections are especially painful or give rise to abdominal cramps, they are discontinued and mercury or mixed treatment is administered by mouth. If the remedies are well tolerated, treatment is continued interruptedly during the entire period of pregnancy. The kidneys and other organs are carefully watched for the development of toxic symptoms. While many of the infants from such mothers are without clinical or serological evidence of the infection, they have not been able to reduce the positive findings in many of the mothers to negative. This is doubtless due to the long duration of the infection in many such patients. Infants born of treated mothers have been carefully examined for cutaneous or visceral syphilitic manifestations and have now been followed serologically for years with negative results.

The birth of a baby with a negative Wassermann whose mother's

¹ Archives of Dermatology and Syphilology, January, 1922.

reaction is positive can more likely be explained immunologically rather than by the anatomical barrier interposed by the placenta.

Fordyce and Rosen's observations are consistent with Williams regarding this, that a positive material blood does not necessarily imply the existence of fetal syphilis, nor do the findings in the fetal blood at birth necessarily give positive information. They have seen well-developed infants at birth give a 4-plus reaction with blood from the cord, but ten days later give a negative one, which subsequently remained persistently negative both serologically and clinically. Williams found infants with a negative Wassermann reaction at birth and a syphilitic placenta, develop a positive reaction later, with clinical manifestations. They, therefore, advise in the serodiagnosis of congenital syphilis frequent repetitions of the Wassermann test. They have had under observation during the past year and a half, 140 children who were born of mothers with strongly positive Wassermann tests, but whose own reactions are negative clinically and serologically, the latter on repeated testing.

Regarding the often-advised treatment of infants with a negative Wassermann test born of parents with a positive Wassermann test, Fordyce and Rosen advise against treatment in these cases, but they should be kept under surveillance for several years.

As to the question of the marriage of syphilitics, they believe that a person who has had active syphilitic treatment, is free from all clinical evidence, has a negative spinal fluid and whose blood has been negative for two years may be permitted to marry.

Fordyce and Rosen employ the following in the treatment of syphilitic infants. From six to eight intramuscular injections of neoarsphenamine to the course, the initial dose is 0.1 gm. for infants from two to twelve weeks old; 0.15 gm. from three months to nine months; 0.2 gm. from one to two years, and 0.25 to 0.3 gm. for children three years old. They employ mercuric chloride twelve injections to the course, at intervals of a week, in the following dosage: $\frac{1}{10}$ grain for children from two weeks to six months; $\frac{1}{8}$ grain from six months to one year; $\frac{1}{7}$ grain from one to two years; $\frac{1}{5}$ grain from two to three years and $\frac{1}{4}$ grain for those more than three years of age.

They advise that two full courses each, with proper intervals, be given, regardless of a negative reaction, and possibly a third course of mercury. In very feeble infants they initiate the treatment with mercury, giving about 8 injections before the administration of neoarsphenamine. They have never observed any abscesses even in undernourished infants with a poorly developed musculature, nor any reactions from the drugs have been noted in the dosage given, except an occasional trace of albumin after the mercury.

It is pointed out that the statement is frequently heard that a positive Wassermann reaction in congenital syphilis cannot be changed. Of 47 children with positive reactions who have received one course or more of treatment, 14 gave negative reactions on repeated examinations.

The observation made by Fordyce and Rosen that children born of syphilitic parents may give a positive Wassermann reaction from the umbilical cord blood which may subsequently become negative is of

considerable importance, because I am sure that the average physician would be likely to interpret such a finding at the time of birth as definite evidence of syphilis. On the other hand, I think it is the experience of many of us that children born of known syphilitic parents, and who exhibit negative reactions at birth, may commonly develop within two or three years positive Wassermann reactions or other evidences of syphilis; these evidences may not be the classical manifestations of the disease, but they may merely show a persistent anemia or a persistent subnormal weight which will not be overcome by anything except syphilitic treatment. I cannot but believe that such patients harbor spirochetes. I am sure that there are throughout the country tens of thousands of persons who have congenital syphilis which is entirely unsuspected, and I should like to emphasize the point that we must not regard the offspring of syphilitic parents as free of syphilis because of a negative Wassermann reaction at birth or even during the first year. I have seen such children subsequently develop symptoms that have yielded only to antisyphilitic treatment.

Synovial Lesions of the Skin. Attention was first called to synovial lesions of the skin by Hyde in 1883. More recently the subject has been discussed by Lingenfelter, Ormsby and Sutton. This year Mackee and Andrews¹ report two new cases. Synovial lesions of the skin occur over the dorsal aspects of the interphalangeal, metacarpophalangeal and metatarsophalangeal articulations. The most frequent situation is over the dorsum of the articulation between the distal and adjacent phalanges of the index finger and thumb.

There is usually a history, extending at least over several months, of the appearance in one of these situations of a small, globular projection from the skin, which is insensitive unless roughly handled, and which slowly develops to the size of a large pea. When punctured a syrupy, whitish, yellowish or brownish, fluid exudes, occasionally mingled with masses like sago grains. As the lesion develops, it ordinarily assumes the appearance of a vesicle or bulla; some lesions have only an epidermic roof-wall and are exceedingly painful, especially when on the feet. The surface of the lesion is generally smooth and shiny and shows more or less telangiectasia. It may appear roughened or moderately verrucous. It may therefore be slightly warty in appearance, but it is more likely to suggest a thick-walled cyst. The lesion is usually translucent or semi-translucent. Fluctuation is usually present, but there are no signs of infection. Bacteriologic examinations of the fluid yielded negative results in the cases cited by Ormsby and by Lingenfelter. Immediately subsequent to puncture the cyst collapses, but after the lapse of a week or more the cavity refills with a similar gelatinous, glairy fluid.

The pathogenesis is problematical. Anatomically there are no well-defined bursae in these situations; the lesions that have been radiographed show apparent relationship to the underlying articulations.

The authors report in detail two cases. The first occurred in a man, aged twenty-six years, and had been present for twenty years. The

¹ Archives of Dermatology and Syphilology, August, 1921.

second case was of five months' duration and occurred in a woman of forty-eight. Roentgenograms in each of these cases, as in the case described by Lingenfelter, showed no bone involvement, but the roentgenograms in both of the cases showed plainly a connection with the joint cavity.

The treatment of these synovial lesions of the skin requires the complete destruction or excision of the entire secreting cyst wall. Lesions have been carefully dissected out, but the removal must be complete or recurrence takes place. The first patient was treated in this manner and there was no recurrence. Roentgenotherapy is the method of choice. Hyde and Ormsby employed unfiltered Roentgen rays successfully in several cases. The lesions in the second case reported by Mackee and Andrews disappeared completely after one Roentgen-ray exposure. The technic consisted of applying one Holzknacht unit skin distance (one skin unit) unfiltered to each side of the tumor. The articulation was included in the field of radiation. Four weeks after this cross-fire treatment the lesion had completely disappeared and a second exposure of the same dose was given to its previous site.

Statistics and Histological Studies of Fordyce's Disease. Fordyce's disease is a chronic disorder limited to the mucous membrane of the lips and buccal mucosa and is characterized by discrete, yellowish lesions unaccompanied by subjective sensation. The study of Margolies and Weidman¹ is the most comprehensive one on Fordyce's disease that has been reported in the literature.

Their study included a review of the literature, a statistical investigation and a histological study of fourteen human subjects and three monkeys. Examination of 248 persons consisting of 127 males and 121 females of all ages, disclosed the fact that 80 per cent of these persons taken from all grades of society had a few of these lesions present in the buccal mucosa. The youngest age at which they were observed was three years, and the oldest eighty-five years. The range in number of spots extended from five to ten up to hundreds. The lower lip was never the only part involved.

The histologic material consisted of forty-three blocks of tissue excised at necropsy from fourteen human subjects and three monkeys. The authors set themselves a task of determining whether sebaceous glands are present in relation to the spot, to determine whether the spot seen clinically might be at least referable to such sebaceous glands and to ascertain whether what was observed clinically as the spot is the gland itself.

Their studies demonstrate conclusively that in every case sebaceous glands occurred in relation to the clinical spot. They also established the fact that Fordyce spots are fatty, but have not necessarily proved that the clinical appearance is due to the sebaceous glands themselves deeper down. In a careful study of twenty-three blocks of tissue containing Fordyce's spots clinically, a sebaceous gland was found every time. In twenty blocks containing no spots, no sebaceous gland was found, hence proposition number two seems to be answered in the

¹ Archives of Dermatology and Syphilology, June, 1921.

affirmative. Investigations of the third point seem to demonstrate that a submucous factor is responsible for Fordyce's spots, for in various trials, the authors witnessed phenomena which were occurring apart from the surface epithelium. In one case the surface was non-existent and in the other it was moving contrary to the spot.

Concerning the pathogenesis, the authors believe that the spots are probably due, as Audry and Sutton state, to the snaring off and invagination of germinal analgen. They increase in size at about the age of puberty *pari passu* with the general hair and sebaceous gland systems. As the condition is present in 70 per cent of adults, it causes no detrimental symptoms and is not a genuine lesion, the authors agree with Hartzell that there is doubt as to the propriety of calling the condition a disease; that is, the spots have no pathologic significance beyond that of sebaceous glands elsewhere on the body.

TREATMENT OF HAIRY NEVUS. The treatment of hairy nevus is discussed by C. DuBois.¹

Hairy nevi may be large or small; the small ones are usually round or oval, while the large nevi show variable shapes according to their site. These nevi are not usually very clearly visible at birth, but they develop within the first few months or years of life. At first they are merely spots of comparatively light color, covered with light downy hair; later they become thickened, dark, and develop an abundance of hair, especially at the time of puberty. Some pigmented nevi develop hair in adults. In the treatment of hairy nevi, the hairs, the deep hair follicles and the pigmentation must be destroyed, with as little scarring as possible. Surgery is not usually indicated except for the smallest nevi, on account of the scar. Electrolysis will destroy the hairs, and with a bipolar application removes much of the pigmentation. Carbon dioxid snow, the effects of which can be carefully controlled by regulation of the duration of the application, destroys the lesion and removes pigmentation with little scarring. The combination of several methods gives the best results; the single treatments should be spaced at proper intervals, so that the entire process takes considerable time. In this way the skin resumes its proper function after the inflammatory reaction to each treatment, and massive destruction and severe scarring are avoided. In one illustrative case reported, the patient was a girl, aged seventeen, with a large pigmented hairy nevus on the left side of the face around the nose and eye, also involving the eyelid. Electrolytic treatment was first given to destroy the hair, as much as 10 milliamperes being necessary at times for the coarser growth. Then several applications of carbon dioxid snow were made, which removed the pigmentation and rendered the skin fairly normal. This was followed by another series of electrolytic treatments to destroy the deeper hair follicles. These treatments were painful, but usual methods of local anesthesia could not be used without modifying the effects. An ointment containing menthol, carbolic acid and cocain, with a few drops of adrenalin, thoroughly rubbed into the skin prior to treatment, was helpful. Other methods of treatment, including radium and the x-rays, which the author tried in other cases never gave as satisfactory results as the one described.

¹ Rev. med. de la Suisse Rom., Geneva, December, 1921, 41, 769.

DISEASES OF THE NERVOUS SYSTEM.

BY WILLIAM G. SPILLER, M.D.

Paralysis of Associated Movement of the Eyeballs in Tumor of the Brain.

As far back as 1903, I pointed out that paralysis of lateral movement of the eyeballs with preservation of convergence movement indicated a lesion within the brain, and that in a case of tumor where this sign was present, operation would be contraindicated. When the internal rectus muscle is paralyzed in association with movement of the external rectus muscle of the opposite eye but is intact in association with movement of the internal rectus of the opposite eye in convergence, the posterior longitudinal bundle is affected. This is an important observation at times.

A woman was under my care for several years with symptoms of obscure nature but suggesting a basal tumor. The discovery of the phenomenon mentioned above held me back from operation, and necropsy showed extensive glioma of the pons. The posterior longitudinal bundle on the side opposite to the affected internal rectus nucleus was much degenerated. This case would seem to indicate that the connecting fibers between the internal rectus nucleus and the opposite external rectus nucleus probably decussate near the oculomotor nucleus.

Freeman¹ has made a careful study of the paralysis of associated lateral movements of the eyes, based on this case, and has given an excellent critical digest of the literature on the subject.

While operations for brain tumor often are somewhat disappointing, the results in certain cases may be most brilliant. It depends much on the character and position of the tumor and the time of operation. A series of successful cases is reported by Frazier and Spiller.² In one of these an endothelioma was removed from the occipital lobe, with recovery of the patient and freedom from recurrence until the period of the report, three and a half years after the operation. This is the form of tumor from which the best results may be expected, even permanent recovery.

Various subjects are discussed in this paper. Stress is laid on epilepsy partialis continua and its resemblance to the convulsive attacks produced by irritation of the facial nerve.

The most successful case reported is one in which an endothelioma 3 by 2 cm. was removed from about Broca's area, with complete disappearance of all symptoms and no recurrence, now about three years after the operation. The case affords strong evidence for the importance of Broca's area in motor speech, as the patient had attacks of loss of speech and the tumor was in, or very near, Broca's area.

¹ Archives of Neurology and Psychiatry, 1922, 7, 454.

² Ibid., 1921, 6, 476.

Field Defects in Temporal Lobe Lesions. The recent paper by Cushing is an excellent presentation of the importance the visual fields may have in lesions of the temporal lobe, especially tumors. Much depends on the care with which the fields are taken, as slight defects may readily be overlooked. In lesions of the temporal lobe a partial defect in the visual field is more likely to occur than in lesions of the occipital lobe, because the visual fibers in the former instance are more separated in their passage around the descending horn of the lateral ventricle.

Cushing has had 59 verified cases of tumor of the temporal lobe out of 276 verified tumors of the cerebrum, or over one-fifth of all cerebral tumors. For this large proportion two explanations are offered. One lies in the fact that, owing to the common practice of performing a right subtemporal decompression in tumors of doubtful situation, an unexpected temporosphenoidal lesion has not infrequently been disclosed.

Another explanation he offers is that tumor localization in this relatively silent area has of late years become more and more exact owing to better interpretation of field defects.

In 39 of his 59 temporal lobe cases, perimetric charts of value were obtained, but in the remaining 20 cases the tests were untrustworthy or impossible. No defects of the fields were found in 6 cases. Homonymous hemianopsia was present in 8 cases. In none of these had fields been plotted sufficiently early to detect quadrantic defects. In 4 of these 8 cases the macula was included in the field bisection at the time of the examination.

Partial hemianopsia was present in 25 cases, and these defects were more or less quadrantic in character. Cushing¹ has found that the field defect in the eye on the side of the lesion is likely to be in advance of the other. He mentions that many physicians believe a homonymous hemianopsia indicates an occipital lobe tumor, forgetting that it may occur with temporal lobe lesion. He makes it very evident by this paper that field defects tested carefully by the perimeter are probably the most important diagnostic aid in lesions of the temporal lobe.

Other symptoms in his temporal lobe lesions are important. Convulsions were recorded in 20 of the 59 cases. They usually were few in number. A single convulsion without aura or sudden loss of consciousness, possibly unattended by convulsion, had been the inaugural symptom in three or four instances. A few of the patients had had only two or three convulsions and twelve was the largest recorded number.

In the 59 cases attacks often described as *petit mal*, or as more or less characteristic "dreamy states," were present in 24 cases. In 14 only of these cases were there olfactory or gustatory impressions and in some of these the possible uncinate character of the attacks was not particularly definite.

Visual hallucinations were recorded in 13 out of the 59 cases. They are believed by Cushing to be a part of the uncinate seizure, for in only 3 of the 13 cases did they occur unrelated to what were regarded as attacks of this type. In his cases whenever the situation of the hallu-

¹ Brain, 1921, 44, 341.

cinations was mentioned, they were referred by the patient to the side opposite that occupied by the lesion, *i. e.*, to the defective fields. Cushing has found visual hallucinations more common in temporal lobe tumors than in occipital lobe tumors.

In none of his cases of temporal lobe tumors was there anything suggestive of auditory hallucinations of musical sounds or imagined speech, nor did he find any pronounced loss of hearing. Auditory phenomena were conspicuous by their absence. In a few cases only was there tinnitus and rarely some lowering of sound perception. Some of his cases had symptoms suggesting cerebellar lesions.

Intracranial Telangiectasis. Two cases are recorded by Hammes¹ in which, at operation, dilated bloodvessels were found. In the first case they were in the pia over the right motor region, arranged in the form of an irregular circle. These were ligated in four places and the dura was closed. During the next twenty-four hours the patient had twelve convulsions of such severity that chloroform had to be administered. The following night he had two more, and then the convulsions almost ceased. In the second case the dura of the right frontal region was found to be bluish from a pronounced angiomatous condition on the surface of the brain cortex. The mass of bloodvessels covered the entire operation field and appeared like a nest of bluish angeworms. Vessels were ligated in several places; bleeding was profuse but easily controlled. The patient made an uneventful recovery both physically and mentally. These two patients had no superficial telangiectasis and knew of none in relatives.

Surgery is the only treatment for these patients, in Hammes's opinion, and he refers to the fact that ligation of the dilated bloodvessels has given surprising results in some instances. I have mentioned in describing a case of this condition, that extensive ligation may have serious consequences. In one case observed by me, hemorrhage occurred into the brain; and in another, hemiplegia resulted. One should be careful in ligating cortical vessels not to cut off too much of the blood supply.

Brain Swelling. The subject of brain swelling is a difficult one—the diagnosis must frequently be uncertain from the clinical aspect, as it may be incapable of verification. Swelling of the brain is one of the causes of pseudotumor of the brain. Dorner² reports a case in which symptoms of brain lesion developed after trauma, and some bulbar disorder was diagnosed. Death occurred suddenly and the necropsy revealed no positive sign of any trauma, but the medulla oblongata showed flattening, with chronic swelling of the brain, from which atrophy of the inner portion of the skull was produced. Death seemed to be caused by acute exacerbation of the chronic swelling of the brain. The immediate cause was attributed to a lesion in the medulla oblongata. It is doubtful whether the clinical diagnosis of brain swelling ever can be made with certainty and there is grave danger that it might be made incorrectly in many conditions. It is one of those diagnoses which fit many clinical combinations of symptoms and could be made too easily after inadequate study of a case.

¹ Archives of Neurology and Psychiatry, 1921, 6, 263.

² Deutsch. Ztschr. f. Nervenhe., vol. 72.

Pseudotumor of the Brain. Various pathological conditions have been found to give symptoms suggesting tumor of the brain. Bassoe and Hassin¹ report a case in which the diagnosis of brain tumor seemed clinically justifiable, and several operations were performed in the hope of removing the supposed tumor. Epileptiform attacks of petit mal and grand mal types were the principal symptoms, and after death a large indurated area was found in the interior of the left hemisphere in which the capillaries were infiltrated with a hyaline or colloid material and also calcified to such an extent that decalcification was necessary before for the preparation of suitable microscopic specimens.

Calcification of the Pituitary Gland. Attention has been given for a long time to the size and shape of the sella turcica and to the clinoid processes in their relation to pituitary disease, but Pfahler and Pitfield² emphasize the importance of studying the density of this area as compared with the immediate surrounding brain structure. If the pituitary is not calcareous there should be no difference in the density of this area within the sella turcica. Calcareous deposits will indicate a diminution in the total value of the pituitary just as much as if the area were compressed by a small sella. Pfahler and Pitfield believe such infiltration is a definite indication of disease, either present or past, within the gland, and yet calcareous deposits may be present or at least the gland may be more dense in persons who have no definite symptoms. They report 9 cases in which calcification of the gland was indicated by the roentgen ray, with more or less evidence of hypopituitarism.

Epidemic Encephalitis. Grossman,³ in May, 1921, after the re-examination of 89 patients who had recovered from an acute attack of epidemic encephalitis from six to twenty-four months previously, offered the following conclusions:

1. Probably less than 20 per cent of the patients who become ill with this disease die during the acute stage of their illness, as only the most severe cases, as a rule, reach the hospital.
2. Of those who survive the acute stage, about 10 per cent may develop a progressive disease of the central nervous system.
3. The remainder will make a good functional recovery in from six to twenty-four months after the acute infection, with the probability of progressive approach to the normal after that period.

Within the few months which have passed since the publication of this paper, he has found these conclusions inaccurate and too optimistic. Re-examination of many of these patients, and of others who have come under his observation within the past year, emphasizes the importance of allowing time to play its part in the evolution of the disease. He has re-examined 92 patients who had survived the acute stage from one to three years prior to the examination. There were 25 who were observed three years after their acute illness, 47 two years after, and 20 one year after. Ten patients had recovered completely; they had no definite complaints, and did not show any evidence of damage to the central or peripheral nervous system.

¹ Archives of Neurology and Psychiatry, 1921, **6**, 359.

² American Journal of the Medical Sciences, 1922, **163**, 491.

³ Journal of the American Medical Association, 1922, **78**, 959.

Fourteen others had recovered sufficiently to permit a return to work; of these, 4 showed only facial asymmetry, 6 showed facial asymmetry in addition to other residual signs pointing to cranial nerves. The remaining 4 patients showed disturbed cranial nerve innervation and a spontaneous tremor of the tongue, facial muscles or the extremities. All but one complained of psychic disturbances, such as insomnia, irritability, depression or headache.

Sixty-two patients all showed at the time of their examination a serious and more or less progressive involvement of the central nervous system. Forty-two of the 62 presented a clinical picture which closely resembled that of paralysis agitans. It was not possible to determine the date of onset of these symptoms. The symptoms had come on so insidiously and the progression had been so gradual that in most cases no period of commencement could be given. In a few cases a definite period of freedom from symptoms was noted. This varied from four months to one year.

Many forms of psychic disturbances were observed. Psychoneurosis, fear and compulsion neurosis, anxiety states and hysterical exaggeration of symptoms were frequently found. Fifteen of the patients still complained of insomnia, and many others had difficulty in falling asleep. Most of these patients still complained of drowsiness during the day. Seven patients were despondent and complained of marked depression, and stated that they had lost interest in current events. Failing memory, especially for recent events, was a common complaint. When they read, they found it difficult to concentrate, and they soon forgot what they had been reading about. Others were irritable and worried much about their illness. Many complained of morbid fear. Most of the patients seemed to dread the night. The fears were pronounced in some patients and for unimportant occasions, as, for example, one patient who was afraid to ride in an automobile, train, or street car because she feared it would get beyond control and go too fast. The thought of this possibility would make her sick when she entered a car.

In view of these and similar findings, we may share the opinion of Grossmann when he says the prognosis as to the ultimate recovery from epidemic encephalitis should be a guarded one, even though the patient has recovered from the acute attack. It seems to me that those who have studied the pathology of this disease cannot be surprised by the persistence of serious symptoms after the acute attack.

Holthusen and Hopmann¹ have observed and reported the outcome of epidemic encephalitis in a number of cases in the Medical Clinic of Heidelberg. In one group they place the cases studied through the onset and height of the disease until twelve months after the commencement. In the second group they place the cases in which the onset of the disease had not been seen but the diagnosis seemed certain.

In 24 patients of the first group only 4 were regarded as cured, and 3 of these complained of sleeplessness. In all the others some symptoms persisted and most of them felt that they had not fully regained their

¹ Deutsch. Ztschr. f. Nervenh., 72, 101.

health. Seven had not been able to resume their occupation, 3 had been obliged to seek other employment, 5 were only imperfectly fitted for work, and only 10 had fully resumed their occupation. In the majority of cases the residual symptoms were of mild character, and only in 2 were they severe.

In the mild cases, ocular disturbance was the sign of a previous encephalitis, especially slow light reaction and inequality of the pupils, never complete reflex pupillary rigidity. Horizontal nystagmus was frequent, and ocular muscle palsy was observed also. Adynamia was a serious result. The patients felt they were not the same as they had been—they had lost their energy and initiative. They showed indifference to their surroundings and had lost their cheerfulness and wanted to withdraw themselves from their companions. They needed more time to do things. They would sit still staring and needed to be driven to any occupation. To anyone familiar with this disease the condition in question needs no description. In some cases the symptoms suggested paralysis agitans or Wilson's disease; in others, involuntary movements and pain were conspicuous.

Epidemic Encephalitis and Wilson's Complex. Cases are becoming fairly numerous in which the symptoms of epidemic encephalitis have yielded to those described by Wilson as a result of progressive bilateral degeneration of the lenticular nucleus. I have seen a number of these, and the difficulty is to class them under Wilson's symptom-complex or under paralysis agitans. Oeckinghaus¹ reports 4 cases in which the second phase of disease in its slowly progressive course, the nervous symptoms, the liver changes, etc., resembled closely Wilson's description; but the first phase was that of epidemic encephalitis. As he states, it is impossible to accept both diagnoses in these cases—the patients evidently had only one disease, and that was epidemic encephalitis.

It has been shown by Howell² that no characteristic gold chloride curve is obtained with cerebrospinal fluid in epidemic encephalitis, that there is no relation between the colloidal gold chloride reaction and the duration of the disease, and that spinal fluid from a patient with epidemic encephalitis may give a typical paretic curve with colloidal gold chloride when there are no symptoms or history of syphilis.

Lethargic Encephalitis in its Relation to Poliomyelitis. While the work of Neustaedter, Larkin and Banzhaf³ does not prove the identity of these two diseases, it is important to know that 5 monkeys were completely protected from poliomyelitis by sera of patients convalescent from 4 undoubted cases of lethargic encephalitis and 1 suspected case, and that the results of these investigators compare favorably with the results of other investigators in the neutralization experiments of poliomyelitis virus and convalescent human poliomyelitis sera.

Transient Hemiplegia from Increased Blood Viscosity. Various explanations have been offered for the occurrence of transient hemiplegia, a

¹ Deutsch. Ztschr. f. Nervenhe., 1921, **72**, 294.

² Archives of Neurology and Psychiatry, 1922, **7**, 229.

³ American Journal of the Medical Sciences, 1921, **162**, 715.

condition not uncommon in the aged. Holmes¹ refers to this condition and gives the facts as they are known. It results from a disturbance in the circulation of the blood, in one or more of the cerebral vessels, which is not of sufficient duration to result in permanent damage. It is to be distinguished from the transient hemiplegia in general paralysis of the insane. Several writers, notably Russell, have referred to arterial spasm, and the diagnosis is a safe one; it can neither be confirmed nor refuted. The theory of increased viscosity, as advanced by Holmes, is ingenious and new. As he puts it: The resistance offered to the flow of a fluid through a tube will depend not only on the size, shape and smoothness of the tube lumen, but also on the character of the fluid. By viscosity is meant that quality of a fluid which tends to cause the molecules composing it to remain in contact. It has nothing to do with specific gravity, since a liquid such as mercury may have a very high specific gravity and yet flow freely because of a low viscosity, while glycerine, which has a relatively low specific gravity, has a high viscosity. The viscosity of blood is subject to fluctuation depending on changes in salt, colloidal, gaseous and water content and the corpuscular concentration. An increase in the number of cells, of the colloids in suspension, or carbon dioxide causes an increase in viscosity. Increases in the water oxygen or salt content lower viscosity. The degree of dehydration which may result from severe diarrhea, vomiting, cholera, etc., may become so extreme as to constitute an urgent indication for the subcutaneous or intravenous introduction of fluid in order to restore blood volume and decrease blood viscosity. Severe sweating occurring under conditions which preclude the possibility of replacing the water lost may also result in a sufficient concentration of the blood to produce symptoms.

Holmes² reports a case in which the patient, on two occasions, had taken very hot baths during the early evening hours; six or seven hours later, in the early morning hours, when the cardiac rate, blood-pressure and respiratory rate were presumably at their lowest ebb, he had hemicranial pain and hemiplegia. If the baths played a part in the pathogenesis of the condition, it would seem that they did so by reason of sudden changes either in blood-pressure or in blood distribution, since there had been no untoward symptoms during or immediately after the baths. Even if the baths had resulted in a marked change of the blood-pressure, the time which elapsed before the onset of the paralysis should have been ample to permit readjustment. It was surmised, therefore, that the effect of the hot baths must have been of such a nature as to result in increased blood viscosity through loss of water by perspiration, and increased viscosity would result in increased resistance to the flow of blood through the capillaries. Holmes believes the paralysis was not persistent because the patient had insisted upon sitting upright in bed. This exertion was supposed to result in accelerated cardiac rate and higher blood-pressure, thus establishing the circulation before coagulation of the stagnant blood could occur.

He refers to another case: A man in the fifth decade of life had two

¹ *Journal of the American Medical Association*, 1921, **76**, 1640.

² *Loc. cit.*

attacks of transient aphasia following sweating brought on by unusual muscular exertion. Because of difficulty on urination as the result of prostatic disease, or because of the inconvenience of frequent nocturnal urination, many elderly men restrict their fluid intake and they should be warned against this practice. Holmes advises that in the case of patients of advanced years, or those known to have vascular disease, and in those who have had cerebral vascular crises, dehydration of the tissues should be avoided.

Extracapsular Hemiplegia. This condition was first made prominent by v. Bechterew under the name of hemihypertonia apoplectica, and Boettiger¹ has collected 31 cases observed by himself. Twenty-seven of these were right-sided; this large proportion is remarkable. Aphasia was present in none. The condition is characterized by the absence of true paralysis, but there is much increase of muscular tonicity in the limbs of one side. There are not the characteristic contractures and positions of hemiplegia, and the tonicity of the affected limbs is increased by active movement of the normal limbs. The tendon reflexes are not increased on the side of the hypertonia; there is no ankle-clonus and no Babinski reflex of upward movement of the toes in typical cases. Boettiger adds nothing to the pathology of the condition, but it seems reasonable to conclude that the cause is to be found in apoplexy of the lenticular nucleus.

Subthalamic Lesion. A case in which the symptoms were right hemiparesis, right hemianesthesia without pain, right hemiasynergia and right hemianopsia of the superior quadrant was believed by Foix and Bouttier² to indicate a limited lesion of the posterior cerebral artery in the subthalamic region. The absence of pain rather implied that the lesion was outside the thalamus, and the quadrantanopsia confined to the superior quadrant of each eye indicated that the lower fibers of the intracerebral visual system were affected. A localization such as this would be of value in tumor.

Tetraplegia. Paralysis of all four limbs is fortunately of rather rare occurrence. Wilson³ reports several cases of this type, and mentions the paralysis that may be caused by occlusion of the anterior spinal artery, hematomyelia, cervical myelitis, pressure on the spinal cord as from tumor, Pott's disease, hypertrophic pachymeningitis, extramedullary hemorrhage, injury of the spinal cord or chronic degenerative disease of the spinal cord. A paralysis of all four limbs is one of the most alarming events a person may experience, and yet in most of the cases recorded by Wilson improvement occurred. He believes the cases with the most favorable prognosis are those of syphilitic origin in which the treatment is pushed. One patient who developed tetraplegia during the course of epidemic encephalitis and was bedfast for months made a complete recovery.

Diffuse Brain Sclerosis. This is a rare pathological condition of the brain in which an overgrowth of the neuroglia causes unusual firmness

¹ Deutsch. Ztschr. f. Nervenh., 1921, **68** and **69**, 165.

² Revue Neurologique, December, 1921, p. 1270.

³ Journal of the American Medical Association, March, 1922, p. 713.

of the structure. In one case, I had the opportunity to study the brain when first removed; it was as hard as though it had been placed in formaline. A syphilitic history has been obtained in some cases, but Giannuli¹ seems to have been the first to find the spirochete. He had 2 cases of this disease and in 1 of these, after failing to find the organism by the Noguchi and Levaditi methods, he finally succeeded in doing so by the Jahnke method. The spirochetes were obtained in large number but only in the gray matter of the cerebral cortex. As in the brains from cases of paresis, the spirochetes were in some places diffusely scattered; in others collected in masses. They had some peculiarities which caused them to differ from the spirochetes of paresis. They were unusually long and thick and had other peculiarities which led Giannuli to consider them as possibly the form of spirochete peculiar to hereditary syphilis, but more probably as a degenerative form such as has been seen in parietic brains. From these studies Giannuli concludes that diffuse brain sclerosis is a chronic interstitial encephalitis not only of endogenous, but also of exogenous origin.

Syphilis. Another one of the interesting papers on syphilis of the nervous system has come from Fordyce (this time in association with Rosen).² They believe that not more than about 25 to 30 per cent of all secondary syphilitics show infection of the central nervous system. This can, in the majority of cases, be determined with certainty only by a lumbar puncture, as in the early months clinical signs are often negligible, and to wait until the latter appear usually requires a longer time to bring about negative reactions.

It is remarkable that their statistics show that the incidence of nervous system involvement is much higher in men than it is in women. It recalls a time many years ago when women erroneously were thought to be almost exempt from *tubercles*.

They do not believe neurosyphilis has increased since the use of the modern antisyphilitic remedies. The increase is more apparent than real, and is to be attributed to the more systematic investigation of patients and our more thorough knowledge of the disease. It seems hard to understand how anyone could entertain a contrary view to this.

Their statement is important that we have no proof that arsphenamine adversely affects the optic, auditory or other cranial nerves. On the contrary, we have very definite data showing arrest of optic atrophy by the proper use of the drug. This statement is important because the belief is still held by some that arsphenamine may affect the optic or auditory nerve.

These authors say one should always have in mind the general infection and especially the involvement by it of the cardiovascular apparatus and the eye. A persistent negative Wassermann reaction in the blood is frequently found with positive phases in the fluid and with an active process. A patient should never be discharged as cured without the information gained by lumbar puncture. When this has been neglected,

¹ *Deutsch. Ztschr. f. Nervenhe.*, 1921, **71**, 306.

² *Journal of the American Medical Association*, **77**, 1696.

it has in many cases led to disastrous consequences and incurable conditions.

Pupillary anomalies and cranial nerve paralysis are often pathognomonic, and are always suggestive of nervous syphilis. In papillitis and optic neuritis occurring in early syphilis, vision may be normal, with only slight narrowing of the fields. The necessity for routine ophthalmological examination must therefore be emphasized so that the earliest changes may be detected before irreparable damage is done to the eye. While acknowledging the truth of this, I think it well to state in this connection, since epidemic encephalitis has become relatively frequent, that this disease may leave pupillary anomalies behind it resembling closely those of syphilis.

The absence of clinical signs and symptoms, Fordyce and Rosen say, does not exclude syphilis of the central nervous system. The classical signs and symptoms of tabes may occur with a negative blood and spinal fluid. Likewise, neurosyphilis of the vascular, gummatous and other types may present subjective and objective symptoms with only an excess of globulin in the fluid.

The colloidal gold reaction has been employed by them for six years. They consider it of great diagnostic and prognostic value. A luetic curve enables them with almost absolute certainty to exclude paresis. A paretic curve is always present in paresis in untreated cases, but may be encountered in meningovascular syphilis and may disappear under treatment. A paretic curve is also found in some types of early neurosyphilis and disappears as the other phases become negative.

Solomon and Klauder¹ also assert a fact which must be accepted, that there are cases in which, even in the presence of an active progressive pathological process, the tests on the spinal fluid will be essentially negative, and it follows that one must consider the clinical facts in order to make a diagnosis without depending entirely on the laboratory examination of the fluid. It has become fairly general to consider a patient free from active neurosyphilis who shows no evidence of inflammatory or degenerative changes, as shown by the spinal fluid tests. There are other cases in which, despite the absence of signs or symptoms of a neuraxis involvement, the spinal fluid tests are strongly positive.

The *treatment of syphilis of the nervous system* is still a subject of active discussion and far from definite solution. The results of some investigators are often contradictory to those of others, because so many factors must be considered in reaching a decision. One of the most recent papers on this subject is by Schaller and Mehrtens.² They believe that intravenous and intramuscular therapy causes symptomatic improvement in the majority of cases, but in their own cases a cure was only in 19 per cent serologically, *i. e.*, the Wassermann reaction became negative in all dilutions, the globulin normal and the cell count three or less.

Drainage seemed to them a definite advance, both in ability to

¹ Journal of the American Medical Association, 1921, p. 1701.

² Archives of Neurology and Psychiatry, 7, 89.

ameliorate symptoms and in tendency to improve the spinal fluid pathology.

Intraspinal medication they found superior to the intravenous and intramuscular methods in its effectiveness in clearing up the spinal fluid. Negative findings serologically were obtained in 48 per cent of the cases as compared with the 19 per cent following the intravenous method.

The most useful field for intraspinal therapy is that of the meningo-parenchymatous types, including tabes. Patients with optic atrophy and with tabes without meningeal reaction received no benefit. Patients with parenchymatous lesions (including paresis) did poorly, but in 25 per cent of the cases thus treated there was clinical and serological cure. A remission, at least, was effected.

In their experience, complications in intraspinal therapy are no more frequently met with than in intravenous medication.

The method of treatment in a given case recommended by them is to begin with intensive intravenous and intramuscular medication, particularly in vascular, meningovascular and diffuse lesions. Failure to reduce spinal fluid findings to negative after a thorough trial should suggest the advisability of using more intensive methods. Drainage combined with intravenous injections again should be the procedure of choice when the facilities for more complicated methods are lacking or when symptoms of increased spinal fluid pressure are distressing. The Swift-Ellis, Ogilvie or Byrnes method should be reserved for cases resistant to the foregoing efforts. These resistant cases will be found especially in tabetic patients.

Strauss, in discussing this paper, remarked that the intraspinal method is fraught with considerable danger, even though the writers of this paper, outside of the few instances they cited, were fortunate enough in not obtaining serious results.

The paper by Schaller and Mehrtens is immediately followed in the same journal by one by Kaliski and Strauss.¹ The latter protest against the intracranial therapy of neurosyphilis, which has a mortality of 20 per cent. They rarely give intravenous medication in acute cases oftener than twice a week, more frequently only every five days, until urgent symptoms are abolished. In the more chronic group, arsphenamine is given not oftener than once a week and in doses ranging from 0.25 to 0.4 gm., never higher. They are convinced of the futility of intraspinal and intracranial therapy and unhesitatingly condemn it. They believe that on every patient with early syphilis lumbar puncture should be performed at least once, preferably at the end of the first year of treatment and earlier if indicated by clinical evidence of involvement of the nervous system. If the result is negative it need not be repeated, if treatment is continued, until the third or fourth year. They believe that much harm may be done during treatment by too frequent tapplings. They do not permit the performance of puncture in the outpatient department or consulting room, but insist on at least one day's rest in bed immediately following tapping. They state that a review of the

¹ Archives of Neurology and Psychiatry, 1921, p. 98.

literature has shown a growing tendency in this country to restrict intraspinal treatment to very narrow limits, and in Europe, with few exceptions, there has been a general abandonment of intraspinal methods. They still hold that intraspinal treatment has very limited value, and they give excellent reasons for their belief. I find myself much in sympathy with the arguments advanced in this paper.

Mercurial inunctions have been much employed, but a serious objection to their use has been the uncleanness of the method. Cole, Gericke and Sollmann¹ believe the only mercury absorbed is that part of the ointment which is rubbed into the hair follicles and entrances of the sebaceous and sweat glands. Hence, all superfluous ointment remaining on the skin may be cleansed off immediately after the inunction without lessening the mercurial effect. They think they have proved this clinically from 44 clinical cases treated by this technic.

Juvenile Tabes. Baumgart² has collected the reports of 129 cases of juvenile tabes or taboparalysis, and to these adds 1 more. In 34 no neuropathic inheritance was observed, but in all the others there were signs of inherited weakness of the central nervous system. This was shown most distinctly by syphilis of the nervous system in the parents in the form of tabes or paresis, and it was striking that so frequently the same form of nervous syphilis was seen in the parents and their children. The father was much more frequently diseased than the mother. In the whole 130 cases, 74 were females and 55 males; in one case the sex was not mentioned.

Tabetic Ulcer. The trophic disorder known by the French as mal perforant (tabetic ulcer) may occur after freezing of the feet, as shown by Achard and Thiers,³ and they report a few cases in which these typical tabetic lesions were found. In 1 case spontaneous fracture of the first phalanx of the great toe occurred without the patient being aware of it.

Pupillary Symptoms from Trauma. It has always been a matter of doubt whether the Argyll-Robertson pupil can be caused by trauma, it is very difficult indeed to exclude syphilis. A few cases regarded by v. Rad⁴ as satisfactory are on record, but the disorder of the pupil was unilateral. He reports a case in which repeated laboratory tests gave negative results and the Argyll-Robertson pupil was bilateral. A fracture of the skull had occurred some years previously. The convergence reaction was feeble and slow but was distinctly present; it may be that it had failed at first, but partial recovery had occurred. One may well doubt whether negative laboratory tests can be regarded as excluding syphilis, we should hardly believe that a case of tabes with such negative tests could be asserted to be without syphilis.

Injection of Air into the Vertebral Canal to Determine the Level of a Tumor of the Spinal Cord. It seems possible to inject air into the vertebral canal so that the upper and lower parts of the canal can be photographed but not the intervening parts, according to Bingel.⁵ The amount of

¹ Journal of the American Medical Association, 1921, **77**, 2022.

² Ztschr. f. d. ges. Neurologie u. Psychiatrie, **71**, 321.

³ Revue Neurologique, 1921, p. 826.

⁴ Deutsch. Ztschr. f. Nervenhe., 1921, **68** and **69**, 144.

⁵ Deutsch. Ztschr. f. Nervenhe., **72**, 359.

air about the thoracic cord is not sufficient for such a photograph. The attempt therefore to show the level of the tumor by the column of air in a roentgen plate has not been very successful. The air injected by lumbar puncture will enter the subarachnoid space of the brain and the ventricles if there is no obstruction. Bingel has found in two cases in which he diagnosed tumor on the spinal cord that pain was produced when the air reached the intradural obstruction and the pain indicated by its location the level of the tumor.

Wideroe also was unable to show the level of a spinal cord tumor by a roentgenogram, but in one case the air within the spinal dura caused great pain seven or eight hours after its injection, at the level of the seventh cervical vertebra, and the pain disappeared after lasting three or four hours. As the symptoms also indicated the same level, operation was performed here and a tumor was found. He attributed the pain to the passing of the air through the narrow space about the tumor.

In the first case reported by Bingel, headache and nausea were very moderate, showing that little air had entered the cranium, but the patient had much abdominal pain. This was of aid in the finding and removing of a tumor of the cord. He believed the pain was caused by displacement of the tumor by the air in its attempt to force its way above the obstruction, as in this way tension is made on the posterior roots of the affected part. The second case proved to be one of spinal pachymeningitis. In two other cases in which the lesion was believed to be within the substance of the spinal cord injection of air caused headache and vomiting, but no spinal pain indicating that the air passed into the cranium without meeting an obstruction. This method therefore promises to be of service.

Sicard and Forestier¹ have described an oil containing iodine prepared by Lafay which is opaque to the roentgen ray and therefore of service in determining by these rays the permeability of the epidural or subdural space. Air has been employed for this purpose, but it has not been very successful in photographing lesions within the vertebral column. This oil is very heavy and flows according to the position of the patient. It would appear as though it would be of service in spinal surgery, especially in tumors.

Spinal Cord Tumor with Symptoms of Multiple Sclerosis. It is seldom that a diagnosis must be made between tumor of the spinal cord and multiple sclerosis, but a case with such a difficulty is reported by Müller and Dattner.² The lesion was an intramedullary lesion, and the symptoms were nystagmus; intention tremor and ataxia of the upper limbs without disturbance of the deep sensation and stereognosis; spastic palsy of the lower limbs; loss of abdominal reflexes and some sensory disturbance. Later the symptoms of a transverse lesion developed rather rapidly, causing complete paralysis of the lower limbs. A remission of over two years in duration, with disappearance of symptoms so that dancing was possible, strengthened the diagnosis of multiple sclerosis. Lumbar puncture gave the findings of obstruction of the

¹ *Revue Neurologique*, December, 1921, p. 1264.

² *Ztschr. f. d. ges. Neurologie u. Psychiatrie*, 1921, **71**, 234.

circulation of the cerebrospinal fluid. Return of symptoms permitted the diagnosis of tumor of the cord to be made and operation was performed, with the discovery of a very large tumor, a glioma. It was 16 cm. long and extended throughout the cervical region into the upper thoracic region.

The nystagmus is said to have been found repeatedly with tumor of the spinal cord and is explained by increased pressure of the cerebrospinal fluid or by serous meningitis. It is remarkable that more symptoms from involvement of the upper limbs were not observed. The remission of more than two years in duration is not explained by the authors, and certainly is not a common occurrence with tumor.

Multiple Sclerosis Simulating Tabes Dorsalis. It is not likely that a diagnosis between multiple sclerosis and tabes will cause much difficulty to American physicians, but it is important to know that when the sclerotic patches predominate in the posterior columns they may produce the symptoms of tabes. This fact is emphasized recently by Breithach,¹ and in his case a peculiarity was the tabetic character of the symptoms late and not early in multiple sclerosis. The patient, a woman, caused a suspicion of syphilis by four miscarriages, and her husband died from paresis. She had rigidity of the pupil, myosis, loss of patellar reflexes, ataxic gait, incontinence of bladder and rectum, shooting pains in the lower limbs, girdle sensation, sensory disturbances, hypotonia and optic atrophy. The Wassermann test of the blood and spinal fluid was negative, but the Nonne test was positive and the lymphocytes in the spinal fluid were moderately increased. These symptoms certainly suggested tabes.

Disturbance of vision of years' duration as an early symptom and an extreme degree of fatigue after walking a short distance were regarded by Breithach as suggesting multiple sclerosis, as were also the emotional condition of the patient and the temporal pallor of the optic nerves. A careful consideration of other early symptoms, which later disappeared, made multiple sclerosis probable.

Oppenheim was well aware of the resemblance which might exist between the two conditions, and spoke of the pseudotabetic form of multiple sclerosis. Breithach believes that in some cases the differential diagnosis between the two diseases may be impossible; indeed, the two diseases may be present in the same case, as he believes occurred in the case he studied. Two organic disorders of the nervous system do at times occur in the same person. I have, for example, made the diagnosis of tabes combined with syringomyelia and verified it by necropsy.

Multiple Sclerosis. TRAUMA AS A CAUSE OF MULTIPLE SCLEROSIS. The etiology of multiple sclerosis is obscure notwithstanding the amount of work done on this subject. Among the causes, trauma has been considered, but satisfactory evidence that trauma can produce this disease has not been obtained, and the requirements presented by Mönkemöller² are reasonable. The trauma must be of a certain severity, other etiological factors must be absent, a reasonable connection must

¹ Deutsch. Ztschr. f. Nervenh., 1921, **72**, 1.

² Ztschr. f. d. ges. Neurologie u. Psychiatrie, 1921, **65**, 241.

exist between the first symptoms and the date of the trauma, and it must be demonstrated that the injured person was well until the time of the trauma. It is not impossible that trauma may increase the symptoms of a multiple sclerosis already existing and hasten its course. Surely, if any opportunity was ever given to settle this question it was offered by the recent war. Multiple sclerosis is a common disease in Europe and usually begins in early adult life, the period of life in which were the majority of soldiers in the war.

Mönkemöller has collected the war cases of multiple sclerosis in the city of Hannover, and the number is not great. In an enormous number of cases of severe injury no signs of multiple sclerosis developed, and when this disease was found the first symptoms could be traced to a time preceding the trauma. Indeed, it seemed impossible to associate the cases which developed after trauma with the trauma in etiological relation, and it is possible they were only of chance occurrence. It cannot be said apparently that the war has given us reason to regard trauma as a common cause of multiple sclerosis.

RELATION OF SYPHILIS TO MULTIPLE SCLEROSIS. Birley and Dudgeon¹ believe multiple sclerosis bears certain resemblances to syphilis of the nervous system in its clinical course and manifestations, but differs from it in two important particulars, first by being rigidly confined to the nervous system, and second by the irregular, patchy distribution of the essential lesions in marked contrast to such systemic processes as tabes dorsalis and general paralysis. They state that multiple sclerosis is said to be unknown in Japan. Their histological examinations have not been complete, but as far as they go they are in agreement with the more recent work which insists on an inflammatory reaction, acute or subacute, in the affected areas. They did not succeed in transmitting the disease to animals, and their bacteriological and parasitological investigations are without result. They do not admit the claim of those writers whose work they have reviewed, that the latter have transmitted the disease to rabbits and guinea-pigs. Even if it be admitted that in certain instances they have transmitted a disease, there is an entire absence of histological proof that the disease so transmitted was multiple sclerosis. Spirochetes have been found by Dudgeon in the livers of apparently healthy guinea-pigs.

Adams supports the spirochetel origin of the disease partly on clinical grounds, but mainly on the presence in the cerebrospinal fluid of 95 per cent of his cases of a luetic or parietic reaction to colloidal gold, on the modification which this reaction undergoes under neosalvarsan treatment and on the beneficial clinical effects of antisypilitic treatment in early cases of the disease. Birley and Dudgeon feel that until the *rationale* of the colloidal gold reaction is more completely understood, arguments based on the presence and behavior of the reaction are unsubstantial, while in view of the remissions so characteristic of the disease the beneficial effects claimed for any therapeutic measures must be treated with the greatest reserve.

¹ Brain, 1921, 44, 150.

While they are of the opinion that in spite of recent investigations the origin and nature of the morbid agent have yet to be discovered, they believe there are sound reasons, both clinical and histological, for the view which regards the morbid process underlying multiple sclerosis as inflammatory in character.

W. E. Gye¹ asserts that the history of the experimental study of multiple sclerosis begins with the publication of a paper by himself. He gives briefly an account of the work of different investigators and reports his results during a recent period of twelve months from the injection of rabbits and in a few instances guinea-pigs with cerebrospinal fluid obtained from 21 cases of multiple sclerosis. He mentions that rabbits especially and guinea-pigs to a less extent are prone to spontaneous paralysis, but in rabbits which become paralyzed after the injection of cerebrospinal fluid the paralysis is not the dominant feature; it is only part of a severe and general illness which, as a rule, progresses very rapidly, but may sometimes be detected for several days before the animal is seriously ill. The clinical differences between these cases of experimental paralysis and the spontaneous cases are so great and constant as to lead Gye to conclude that they are essentially different in origin. The necropsy findings support this conclusion.

In the experimental work on multiple sclerosis the successful experiments are infrequent. In Gye's series one rabbit only in four in the first experiment and one in six in the second showed symptoms. This result corresponds with what other observers have published. The organism, if there be one, is not constantly present in the cerebrospinal fluid and is never present in large numbers. In tuberculous meningitis it is the exception rather than the rule to find tubercle bacilli in the cerebrospinal fluid, and in general paralysis of the insane the spirochete of syphilis is not often found. Differences in susceptibility are easily brought out when the inoculum contains a small number of organisms. The necessary control experiments for his work, namely, the inoculation of a large number of rabbits with the cerebrospinal fluid of persons not affected with multiple sclerosis, has not been done by Gye. He believes, however, that multiple sclerosis is probably an infectious disease and that the virus may sometimes be found in the cerebrospinal fluid.

The relation of syphilis to multiple sclerosis is discussed in an interesting way by C. M. Byrnes,² and numerous references to the literature are given. He recognizes the resemblance of the two diseases in symptomatology and pathology and regards the lesions in multiple sclerosis as inflammatory. The cellular reactions are similar to those of syphilis, and, with the exception of the Wassermann test, the spinal fluid exhibits changes comparable to those in the vascular and gummatous types of cerebrospinal syphilis.

Failure to demonstrate the *Spirochaeta pallida*, or to secure a positive Wassermann reaction in all cases, in his opinion, is no proof that syphilis may not be an etiological factor, and such evidence is often wanting in tabes and occasionally in paresis. A positive Wassermann reaction

¹ Brain, 1921, p. 213.

² Journal of the American Medical Association, 1922, 78, 867.

in multiple sclerosis does not establish its specific nature, as the two disorders may exist simultaneously, or else the disease is syphilis and not multiple sclerosis.

The therapeutic test he holds is of no value as a diagnostic measure, since ineffectual treatment does not disprove a syphilitic factor, nor does effective therapy establish its presence. Tabes does not always respond to antisiphilitic therapy, and certainly the results in the treatment of paresis are discouraging.

The recent findings of a spirochete in multiple sclerosis I think goes far to strengthen the resemblance between the two diseases, but at present the spirochete is regarded as of a different type from that occurring in cerebrospinal syphilis.

Friedreich's ataxia has been reported from time to time associated with syphilis, but it hardly seems that syphilis can be regarded as prominent in etiology. Urechia and Mihalescu¹ believe Friedreich's ataxia is a symptom-complex and may be caused by hereditary or acquired syphilis. They report a typical case in a boy, sixteen years of age, caused by acquired syphilis and established by the positive Wassermann reaction in the blood and cerebrospinal fluid and lymphocytosis of the fluid. May not one, however, ask for more definite proof than this? May not the symptoms of Friedreich's ataxia develop in one who has acquired syphilis without being caused by it, just as it does in one who has not had syphilis?

SPIROCHETE IN MULTIPLE SCLEROSIS. As Schuster² states, no one has been able to detect the spirochete in the human brain from a case of multiple sclerosis, although the most skilful workers have endeavored to do this. Schuster studied the brain from a case of acute multiple sclerosis, and out of several hundred blocks of tissue found the spirochete in six. They were more difficult to stain than the spirochete of syphilis. He tried to stain the organism in several cases of multiple sclerosis with a duration of five to twelve years, and was unsuccessful.

Anemic Changes in the Nervous System. Hamilton³ has made an interesting study of pernicious anemia and he finds that changes occur in the nervous system in 75 to 80 per cent of the patients as they present themselves in the ordinary physician's practice. The frequency of these changes is usually underestimated on account of lack of careful neurological examination. Subjective sensory disturbances constitute the earliest and most frequent evidence of involvement of the nervous system. The most characteristic sensory findings are the relatively greater loss of deep, as compared with superficial, sensibility, but there is by no means normal sensibility to touch, prick and other forms of superficial sensibility. Almost equally as characteristic as the change in deep sensibility is the complaint of subjective sensory disturbances. Their constancy, their steady progress and symmetrical location in stocking or glove distributions, the inability of the patient to describe them in definite terms, and the great distress without ordinarily actual pain are rarely found in other clinical conditions.

¹ Ztschr. f. d. ges. Neurologie u. Psychiatrie, 1921, 71, 207.

² Ibid., 73, 433.

³ Archives of Neurology and Psychiatry, 1921, 6, 1.

This last statement by Hamilton is confirmed by my own experience. It is very common to find that persons with the anemic changes complain of numbness and tingling in the fingers, and if they are women they find it difficult to sew or make use of their hands in delicate work.

Hamilton has found, as have others, that there is a distinct lack of parallelism between the severity of the blood and nervous phenomena, and either may precede the other by a long period of time. Marked remissions in the blood picture, either with or without splenectomy, may fail to show a betterment in the sensory disturbances equal to that in the blood, and may show none at all. Hamilton has even found that an essentially normal cord may be found in a person who has shown marked sensory disturbances. This is certainly a remarkable statement. He also has found that degenerative changes are common in the peripheral nerves, and these may explain some of the sensory changes. Vibration sensibility, or sense of passive movement, may be lost separately, so that the tracts for these sensations must be distinct from one another.

Injuries of the Spinal Cord. A very comprehensive and excellent paper on injuries of the spinal column has been written by Mauss,¹ based on war experience. The injuries to the spinal cord, such as the softening and hemorrhage, are well recognized, but more interesting possibly is the alteration of the meninges, the pachymeningitis and the arachnitis. This may lead to obstruction in the circulation of the cerebrospinal fluid by a tight band about the cord, and the pachymeningitis may occur without any lesion of the vertebral column. Meningitis serosa was found to be common in war material. Marburg and Ranzi, in 142 cases of injury of the spinal cord during the war, found meningeal changes in 121; in 52 cases there was an isolated arachnitis adhesiva or pachymeningitis externa.

An important case described by Mauss was one with signs of complete transverse lesion of the cord, but the tendon reflexes of the left lower limb were normal and those of the right lower limb exaggerated. There were also ankle-clonus and Babinski sign. Laminectomy showed such damage to the spinal cord that no cord was found from the ninth to the twelfth thoracic vertebra. This case did not present, therefore, the loss of tendon reflexes supposed by Bastian to occur in complete transverse lesion of the spinal cord, and is one more to indicate that Bastian's view is not always correct. The paper contains numerous examples of spinal lesions.

Results of Treatment of Poliomyelitis. Lovett² has analyzed 180 consecutive cases of poliomyelitis which occurred in 1916. The patients were under continued care in the clinic of the Harvard Infantile Paralysis Commission. These cases were analyzed with regard to the effect of treatment on the disease and to the existence of any general laws governing either the recovery rate of different muscular groups or the behavior of the disease as a whole. The 180 cases represent the patients of whom continuous records were obtained to the end of the third year.

¹ Ztschr. f. d. ges. Neurologie u. Psychiatrie, 1921, **66**, 1.

² Journal of the American Medical Association, 1921, **77**, 1941.

The muscles of the back and neck improved most noticeably, and nearly all affected neck muscles returned to normal during the three years. More than 75 per cent of all back muscles returned to normal, but the improvement in the abdominal muscles was considerably less, and yet complete abdominal paralysis in women has been found to be no obstacle to child-bearing; certain patients of this type Lovett has known to be delivered of healthy children without difficulty.

He concludes that poliomyelitis affecting the upper extremity is milder and more amenable to improvement and cure than that affecting the lower extremity. Muscles in the upper extremity under treatment improve continuously for four years, the improvement being most rapid in the first year; and in the lower extremity improvement is also most rapid in the first year; but after the third year there is a tendency toward a slight loss of muscular power, especially marked in the lower leg, under the best conditions of intensive treatment that can be afforded in a public clinic when the object of treatment is the prevention of deformity and the avoidance of fatigue, and when muscular reëducation is pursued throughout. The chief cause of this loss is deformity occurring in the lower leg.

The following causes tend to make recovery in the lower leg less favorable than elsewhere in the body, except in the abdominal muscles: (1) A tendency of the paralysis to be more severe from the start; (2) the frequent occurrence of deformity, and (3) the fact that in weight-bearing the greatest amount of strain is thrown on the muscles of the lower leg. The outlook in the tibials is particularly poor, and the more favorable condition in the peroneals explains the predominance of valgus deformity. Deformity must be prevented by every possible means. The essential factors of treatment are the prevention of stretching of paralyzed muscles and contraction of their opponents, the avoidance of fatigue in walking and the preservation of a normal muscular balance between opposing groups as far as possible.

Horse Serum in the Treatment of Acute Poliomyelitis. It is to be hoped that the experience of Rosenow¹ will be fully confirmed by others. He states that the apparent good effects in the treatment of poliomyelitis with an immune horse serum prepared by repeated injection of the pleomorphic streptococcus from poliomyelitis were demonstrated in a series of cases during an epidemic at Davenport in 1917. Similar serums were used in an epidemic at Dubuque in 1918, and have been used since in sporadic cases by himself and by physicians in various parts of the United States to whom the serum was sent on request. The serum, in intravenous and intramuscular injections in man, has given excellent results.

Rosenow also states that nearly all physicians who had opportunity to observe the effects of the immune horse serum became convinced that it possesses definite and often striking power to prevent paralysis, that it is of definite benefit if given within from thirty-six to forty-eight hours after the onset of paralysis, and if given after that it is of less value.

¹ Journal of the American Medical Association, August, 1921, p. 588.

The epidemics studied were severe. The mortality rate and incidence of residual paralysis in the untreated patients were high. The patients treated lived in widely separated communities.

Rosenow concludes that his immune horse serum has curative power in poliomyelitis, especially when given in the early stage of the disease, and that its general use is indicated, and the need for early diagnosis in suspicious cases by spinal puncture is again emphasized. It may be well to state that some physicians do not perform lumbar puncture in early poliomyelitis, fearing it may be the cause of establishing the disease.

Pneumorachis in the Treatment of Meningitis. We welcome gladly any promising method for the treatment of meningitis, but we can hardly feel at present that injecting air or oxygen into the spinal canal has been proven to be of great therapeutic value. E. A. Sharp¹ has presented an interesting paper on this subject. It is true, as he says, that injection of air or oxygen into the cerebral ventricles and sub-arachnoid space has become a recognized and valuable procedure in neurological and surgical diagnosis. As a therapeutic measure he has found this injection by lumbar puncture, producing an artificial pneumorachis, of considerable value in the treatment of some of the acute infections of the meninges.

During an epidemic of meningococcus meningitis he had a few cases in which the purulent spinal fluid was obtained with difficulty, owing to adhesions or blocking of the vertebral canal. Injections of half-strength normal saline solution diluted the fluid and broke up adhesions, permitting a free flow of the purulent fluid. He then found that in some of these cases when oxygen was injected an additional quantity of purulent fluid could be evacuated before injecting the antimeningococcus serum. In other cases the air or oxygen was used alone, with the same favorable results in evacuating the fluid.

The technic, as he described it, is the ordinary procedure of lumbar puncture with the patient lying on the side. After removal of as much fluid as will flow through the needle, the oxygen is injected by means of a 20 cc Luer syringe. The syringe is filled by allowing the pressure from the oxygen tank to force back the plunger of the syringe. Sterile gauze is interposed between the gas cylinder and the syringe during the filling process. The oxygen is injected slowly, using from 5 to 10 cc as measured on the syringe. Removal of the syringe allows the gas and fluid to escape in a frothy mixture. Injection of the gas is repeated, and the head and shoulders slightly elevated to allow the gas to reach the cerebral ventricles. The oxygen seems to act as a mechanical agent in displacing the fluid and opening up pockets secluded by adhesions.

There can hardly be any doubt that in ordinary conditions oxygen will reach the ventricles by this procedure. This is shown, as Sharp says, by the increased amount of fluid forced out, the changed percussion note over the lateral ventricles and by the roentgen-ray photograph.

Sharp has found the therapeutic effect of oxygen or other gases in contact with the meninges or ventricular ependyma difficult to estimate,

¹ Archives of Neurology and Psychiatry, 1921, 6, 669.

but no harm has resulted in his experience in repeated injections of oxygen in the meningococcus cases. The absorption is fairly rapid, as fresh amounts can be injected daily at the times of giving the serum. In my experience, which I confess has been limited, pneumorachis may not always be quite the harmless procedure as presented by Sharp's paper.

In *tuberculous meningitis* he observed that repeated injections of oxygen appeared to produce favorable results in a few cases. Whether it was the contact of the oxygen with the meninges or the repeated lumbar puncture with forced drainage that gave favorable results in three cases he finds it impossible to determine. While the diagnosis of tuberculous meningitis might be questioned in these cases, owing to absence of tubercle bacilli in the spinal fluid, the condition was in all other respects clinically tuberculous meningitis. The spinal fluid in each case showed a high cell count of lymphocytes, clear fluid escaped with considerable pressure, a fibrin pellicle formed on standing, and the globulin and albumin were increased in amount, with a negative Wassermann reaction. One of the children had been under treatment for several years with Pott's disease; another had scrofulous glands in the neck which had been operated on; while in the third case the mother had a tuberculous history, although the child showed no other clinical signs of infection aside from the meningitis. In these cases a complete recovery occurred, while none of the patients showing tubercle bacilli in the spinal fluid recovered, although in most of them the oxygen injections produced temporary improvement and even return of consciousness for a few hours.

Sharp's experience in the treatment of *epidemic encephalitis* by this method is not encouraging—one could hardly expect it to be. He himself states that great value should not be placed on any form of intraspinal treatment owing to the deep-seated location of the lesions in most cases. One case of the epileptic-maniacal type in which the lesion was probably a meningoencephalitis "responded to the lumbar puncture withdrawal of the spinal fluid and oxygen injection," but he dismisses it with these ambiguous words without stating the character of the response. In another case of the lethargic type recovery from the deep lethargy followed promptly the injection of 15 cc of oxygen. One must remember, however, that it is characteristic of this disease for the patient to be aroused from even deep lethargy by moderate stimulation.

He states very clearly that no ill-effects or alarming symptoms have resulted from the oxygen injections. When the larger amounts of gas are retained in the spinal canal, it is better to avoid too sudden elevation of the head and filling the cerebral subarachnoid and ventricular cavities too suddenly. A slight dyspnea, caused by bulbar irritation, has occurred when the filling has been too rapid, but the symptoms he has not found alarming. These statements are based on 64 cases treated by the intraspinal injection of air or oxygen during the past five years. Death occurred in 28 of these. In the meningococcus meningitis cases, only the severe and apparently unfavorable cases were treated by this method. The mortality of 23 per cent he thinks compares very favorably with the

statistics of all cases of meningococcus infection in which the anti-meningococcus serum is used alone.

The mechanical effect of the gas in opening secluded pockets of infection he considers has undoubtedly prevented relapses, as none of the patients who recovered had a recurrence such as occasionally occurs in other cases. Therefore he concluded that his experience in the few cases enumerated shows that oxygen may safely be injected in the spinal canal and that it acts as a mechanical and possibly as a therapeutic agent in the acute meningitides.

Sharp's study is a serious attempt to improve very grave diseases, it was presented before the most critical judges, the American Neurological Association, and the reaction of this body must be noticed.

Ernest Sachs remarked that in epidemic meningitis the organisms sometimes have disappeared from the fluid when the fluid is thick, and it might be questioned whether the oxygen offered any therapeutic help. He thought the type of case in which oxygen might help would be with an anaërobic organism. Using oxygen with an aërobic organism, which the meningococcus is, would hardly seem to inhibit its growth and act therapeutically though it might act mechanically.

Ayer did not feel that air or oxygen is of specific benefit in meningitis, and it should be shown that it is the air and not simply irrigation that is of value. He did not think it had been shown convincingly that the three cases of meningitis mentioned were tuberculous, so that the success of the method in tuberculous meningitis could not be determined.

Sharp believes oxygen probably has little effect, if any, in destroying organisms; the effect is mechanical, although the contact of the oxygen with the inflammatory area might have a therapeutic effect by increasing the vascular supply. To this one might object that in inflammation the vascular supply is likely to be excessive. It might have such an effect as that produced in peritonitis by opening the abdomen to air. Patients with meningococcus meningitis had done better when the subarachnoid space had been fairly free from pus, and in all the cases Flexner's serum had been used early.

Quantitative Estimation of the Total Protein in the Cerebrospinal Fluid. Increase in protein is probably the earliest and most constant abnormality noted in the cerebrospinal fluid under pathological conditions, according to Ayer and Foster.¹ Not only does protein accompany even the most sluggish meningeal inflammatory process, but venous congestions are also accompanied by the appearance of protein in the cerebrospinal fluid in excess of normal. Protein excess may then be an index not only of an exudative meningeal process but also of the degree of permeability of meningeal vessels under pathological or abnormal physiological states. In the one case the protein is of exudative, in the other of transudative, origin.

Ayer and Foster dwell on the unreliability of rough qualitative tests and have employed a quantitative method elaborated by W. Denis. French neurologists have used similar methods for years. The syn-

¹ Journal of the American Medical Association, 1921, **77**, 365.

drome of Froin has excessive protein as its chief characteristic and has been considered almost pathognomonic of spinal-cord compression. But it is only recently that the importance of lesser amounts of protein in the spinal fluid below cord tumors has been emphasized. For more than a year persons suspected of having cord tumor have been systematically studied by combined cistern and lumbar puncture by Ayer and Foster, and opportunity has been given to compare the spinal fluid above and below the obstruction. It has been found normally that the cistern fluid shows slightly less protein than that obtained from the lumbar sac. In almost every case in which tumor has been demonstrated there has been a distinct difference in the protein content of the two fluids. Ayer and Foster believe that even slight increase in protein in a case of suspected cord tumor is an almost constant finding and a sign of great value. They do not pretend that quantitative protein determination is a necessity in the hands of a competent and experienced observer, but they do hold that accurate estimation gives results in more certain and intelligent form, that slighter degrees of abnormality tend to assume unsuspected significance, and that, in consequence, diagnosis is rendered more accurate.

Spinal Drainage Without Lumbar Puncture. Under this rather striking title a new method of administering arsenic is described. The administration of a hypertonic saline solution causes a marked fall of cerebrospinal fluid pressure. The spinal fluid, according to Corbus, O'Connor, Lincoln and Gardner,¹ is restored from the blood stream, and this restoration began about the sixth hour after 100 cc of 15 per cent saline solution had been injected intravenously in the cases studied by Foley. It occurred to these investigators that this phenomenon offered a possible method for increasing the amount of arsenic that would be carried into the spinal fluid after intravenous injection. If the arsenic were injected just at the time when the increased restorative formation of spinal fluid was taking place, it seemed logical that a much larger quantity of arsenic should be carried into the subarachnoid spaces with the fluid.

Their method is simple and painless, and they assert is devoid of all possible posttherapeutic complications and reactions.

The intravenous injection of freshly distilled, sterile, hypertonic solution (15 per cent) is followed by definite transitory symptoms. The administration intravenously of neoarsphenamine dissolved in freshly distilled sterile water at the end of six hours is likewise followed by no distressing sequelæ. The spinal fluid pressure taken at the end of eight hours is within normal limits.

These investigators believe that arsenic penetrations of the cerebrospinal fluid following this method are as constant as, or better than, any method that has been suggested up to the present time. For technic I think it best to refer to the original paper.

Puncture of Cisterna Magna. The cistern puncture originated by Ayer,² to which I referred in my review of last year, has been studied

¹ Journal of the American Medical Association, 1922, **78**, 264.

² Archives of Neurology and Psychiatry, 1922, **7**, 38.

further by him. He refers to the fact that a spinal fluid, apparently normal in every respect except for protein increase, is frequently to be found below a cord tumor; but this finding is only suggestive of pressure on the cord, because a similar picture could be obtained otherwise. Nevertheless, in cases presenting the clinical picture of cord tumor a fluid containing marked increase in protein, and not otherwise abnormal, is a valuable correlative aid in diagnosis, because it speaks for a degree of pressure which is not necessarily destructive. If we could be sure such a fluid indicated tumor, it would be very valuable. Such evidence is furnished by Ayer's method, by means of which it is possible to demonstrate not only that the lumbar fluid is pathological but that the fluid above the tumor is different, and that an obstruction exists between the two.

At the time Ayer wrote his previous paper, only 9 patients had been examined by the combined cistern-lumbar technic; he now reports on 71 such examinations in 65 patients. His method must be left to his own description; anyone interested in this procedure should refer to the author's paper. Ayer drew his material from various sources. Patients under treatment for optic atrophy and general paresis by means of serum administered by the cisterna magna route have afforded opportunity for double puncture as well as patients with other disorders. He has found that, normally, the spinal subarachnoid space permits free passage of fluid in either direction and that the composition of cistern and lumbar fluids is almost identical.

French writers have performed double spinal puncture, but Ayer says their upper field of operation has been the thoracic region, and these writers do not appear to have laid sufficient stress on the importance of pressure changes under different conditions, relying chiefly on the less important laboratory examination of the fluid obtained.

By the use of combined cistern and lumbar puncture, it is possible not only to obtain fluid above and below a supposed cord lesion but also to analyze the mechanical factors involved in the flow of the fluid and thereby estimate the permeability of the subarachnoid space. The importance of the procedure lies in the fact that definite evidence of pathology is forced on the investigator early in the process of compression, and that, if advantage is promptly taken of the findings, a relatively intact cord may be saved. The method may show obstruction in patients in whom compression seems unlikely, whereas the chemical findings from lumbar puncture alone are usually not sufficiently striking until a diagnosis of cord compression is clinically apparent.

Ayer states that cistern puncture requires considerable practice and is a potentially dangerous procedure, and that certain hydrodynamic studies of value may be carried out on the lumbar fluid alone. Most significant of these is the observation of the pulse oscillations and change of pressure on artificially increasing cerebral pressure by compression of the jugular veins. These observations call for a return to the use of the original aqueous manometer, which, in the writer's opinion, should be employed in every diagnostic lumbar puncture. About 500 cistern punctures have been performed by a number of workers so far without serious trouble.

Lesions of the Posterior Tibial Nerve. According to Worster-Drought,¹ lesions of the posterior tibial nerve from gunshot wounds are most frequently overlooked in injuries of peripheral nerves. By posterior tibial nerve is meant that part of the continuation of the internal popliteal nerve which lies between the lower border of the popliteus muscle above and the hollow behind the internal malleolus below. The motor disability from injury of this nerve is relatively slight, more particularly when the lesion is below the origin of the nerve branches supplying the flexor longus hallucis and flexor longus digitorum muscles. The patient usually appears complaining of pain or numbness in the foot; it is seen that he is able to plantar-flex the foot at the ankle and also to flex the toes. The condition Worster-Drought has found is often termed "functional" and "neurasthenic." Many of the 64 cases on which he bases his observations were received with such a diagnosis. When any penetrating wound of the calf or ankle has occurred, it is important to make a careful examination of the foot with regard to the presence or absence of sensory changes over the plantar area, and of paresis, atrophy or abnormalities of electrical reaction in the intrinsic muscles of the foot.

This writer has found lesions of the posterior tibial nerve, among nerve injuries generally, somewhat uncommon. In 1688 injuries to peripheral nerves, he met with 64 posterior tibial nerve lesions. When the nerve is wholly divided and the skin of the plantar area completely anesthetic and analgesic, considerable pain in the sole of the foot on walking may be the main symptom. The source of the pain is in the end bulb of the upper segment, the sensation being referred to its area of distribution. On the other hand the complaint may be "numbness and weakness" in the foot, especially on exertion. Objectively, there is grave impairment of sensation over the entire sole of the foot, hyperextension of the proximal phalanges of the outer four toes and acute flexion of the second and third phalanges. The plantar muscles are paretic and wasted, the concavity of the plantar arch thus being exaggerated. When the lesion lies below the origin of the flexor longus hallucis and flexor longus digitorum, flexion of the toes is well performed; when the lesion involves these branches, voluntary flexion of the toes is impossible. The ankle-jerk is also reduced or impossible to elicit. On faradic stimulation of the posterior tibial nerve on the inner side of the tendo Achillis, the response in the plantar muscles will be greatly diminished or absent.

Worster-Drought advises that when sensory disturbances of long standing are the predominant feature, exploration of the nerve should be considered. If the nerve shows complete interruption, the end bulb of the upper segment should be removed or the fibrous cicatrix excised and end-to-end suture performed. In incomplete lesions exhibiting neuralgic symptoms the freeing of an adherent nerve will usually result in considerable relief.

Surgical Reunion of a Divided Nerve. It has recently been considered important to bring together the two ends of a divided nerve in such a

¹ Brain, 1921, 44, 54.

way as to reestablish the relations of the parts as far as possible in the same way in which they existed before the division, *i. e.*, to preserve the pattern of the nerve. McKinley's¹ work seems to make this effort unnecessary. By a careful study he has shown that the tibial and common peroneal divisions of the human sciatic nerve should be considered as vast plexuses of nerve fibers from the sacral plexus to at least the distal part of the proximal third of the leg. This continuous exchange of fibers among the various fasciculi making up the nerve can mean only a continuous modification of the functional topography of the nerve throughout its length and definitely negatives the conception of Stoffel, Marie and Kraus and Ingham, who would have us think of fasciculi in terms of peripheral branches. From McKinley's work one may conclude that it is not of much importance as to the manner in which the two ends of a divided nerve are brought together by the surgeon, especially if a portion of the nerve should be lost.

Multiple Neuritis. Where are we to search for the chief destruction in multiple neuritis? Stahl² refers to work done with the purpose of answering this question by the study of the sensory disturbances. Sensation is usually most disturbed at the peripheral parts of the limbs, and, according to Walter, the longest nerve fibers are the most vulnerable. The fact that in some cases the sensory disturbances are not parallel with the motor disturbances, that often the sensory disturbances are the more pronounced while in other cases the motor disturbances predominate, would seem to indicate that the lesion must be where the sensory and motor fibers are not united in the nerve, *i. e.*, it must be in the spinal roots. Stahl has made a microscopic study of the nerves in a case of multiple neuritis. He found only scattered areas of inflammation and degeneration in the nerves, but the spinal roots presented much perivascular inflammation, and these roots were regarded as the primary seat of the neuritis. Whether this finding represents a general condition or not must be determined by further microscopic study, but it would explain why, in some cases of multiple neuritis, sensory disturbances are slight or entirely absent. In such a case the motor roots alone would be involved.

True Muscular Hypertrophy. There have been about 20 cases of true muscular hypertrophy reported in the literature, if we may judge from those collected by Krabbe.³ He reports a case in which the hypertrophy was in the lower limbs. The muscular power is not increased proportionally to the muscular development; indeed, the individual afflicted in this manner may be weaker than normal. Krabbe attributes the hypertrophy to neuritis even though atrophy and not hypertrophy is the common finding in neuritis. Babinski has offered an ingenious explanation; he has compared the muscular condition with hypertrophic osteitis. In certain persons reparative processes have a tendency to go too far, as seen in keloids, amputation fibrosarcomas and hypertrophic osteitis. In true muscular hypertrophy the reparative process

¹ Archives of Neurology and Psychiatry, 1921, 6, 377.

² Deutsch. Ztschr. f. Nervenh., 1921, 72, 129.

³ Revue Neurologique, 1921, p. 802.

following the neuritis is believed to have led to excessive development of muscle. Certain muscular structures have a tendency to hypertrophy, as seen in the heart and the uterus in pregnancy. The weakness in this true muscular hypertrophy is to be attributed to the neuritis.

The explanation is most interesting, but there may be some who do not follow Krabbe in his point of view that most of these cases are postneuritic, as there is some doubt as to the existence of neuritis.

A very similar case is reported by Weitz,¹ and in his patient the calf muscles were very large. Following typhoid fever great atrophy and disturbance of gait developed, then the calf muscles hypertrophied, not with great motor power but at first with pain in the calves. Weitz is not inclined to accept the theory of venous thrombosis as the cause of this true hypertrophy, nor does he explain it by irritation of nerve fibers, especially of trophic fibers. He holds that even in adults the individual cells of the body still retain their power of growth but are prevented by the firmness of the body's tissues. Tissue degeneration weakens this firmness of structure and the tendency to growth therefore of the individual cells is not restrained. The primary cause of true muscular hypertrophy is the early degeneration of muscle, and it matters little whether this is from neuritis or spinal-cord disease or primary disease of the muscle itself. The degeneration, however, must not go too far. This explanation does not appear to me to satisfy.

Myasthenia Gravis. Fourteen cases of this disease have been observed by C. L. Dana² during a period of more than twenty-five years. In speaking of duration in his records he means the period under observation and not necessarily the duration of the disease or of the patient's life. Four patients recovered, 2 became practically well, 4 improved, 1 did not improve, 1 died of cancer, 1 died of the disease, and 1 was lost sight of. Strychnine sulphate seems to have been the most important factor in treatment. One patient four weeks after beginning treatment was taking one-fifth of a grain twice daily. Soon after this he began to improve and in two or three months was well and at work. He continued well for ten years. Another patient was taking one-seventh of a grain twice a day hypodermically, and had taken ninety-two injections. The strychnine was continued in one-twelfth grain dose twice a day. He did not improve further for six weeks, then he began to get steadily better, and was well for one year until he died of cancer.

Dana emphasizes the frequency of mild prodromal seizures, the character and length of the remissions, and the often prolonged and favorable course of the malady. One of his patients had five attacks in seventeen years and became well. Another had four attacks in one and a half years and became well. He has observed myotonia in some of his cases, which is a condition not much referred to in this disease. One patient had facial involvement, and when she smiled "the smile would not come off." In another patient the flexed hand could not at once be opened, owing to a flexor myotonus. It could not be caused by strychnine, because it occurred before treatment was begun.

¹ Deutsch. Ztschr. f. Nervenheilkunde, 1921, **71**, 330.

² Journal of the American Medical Association, 1922, **78**, 261.

The ages of his patients were from seventeen to sixty-nine. Eight were men and six women.

Treatment of Migraine. It is not always easy to control the headache recognized by the name of migraine and it may be, as Brown¹ believes, that food has much to do in the causation of this condition. He bases his arguments mainly on clinical data, although in certain cases he supports them by laboratory findings. From a study of his cases he concludes that in certain cases of migraine and other forms of headache, whatever the primary cause, diet plays some part in producing the symptoms of which the patient complains, and that by modifying the diet cure may be obtained in a few cases and a very considerable amelioration of symptoms in many cases. In his series of 50 or more cases, carbohydrates seemed to have played the predominant role in the largest number of cases; animal-protein food in almost as many; special foods, notably sugar or eggs in a very few cases, while in an occasional case the headache might be regarded as a definite expression of intestinal toxemia or bacteremia or of an error in purin metabolism. That some disturbance in liver function plays a part in these headaches is suggested by the fact that there is in some cases a temporary enlargement of the liver during and after the acute symptoms. While it is not always possible to determine to which special form of dietetic error the individual headache may be ascribed, nevertheless in many cases a very careful clinical analysis, supported by certain laboratory tests, offers us a clue as to the *materia peccans*, carbohydrate, animal-protein or purin-rich food as the case may be. In cases in which it is impossible, from the clinical evidence, to incriminate any special food or foods, it is wise, he thinks, to place the patient first on a carbohydrate-free diet for a considerable period of time, and, if this proves unsuccessful, then on an animal-protein-free diet. In certain cases, such treatment will bring about a very marked improvement in symptoms, in a very few apparent clinical cures, although in a large number of cases no effect whatsoever. Finally in this group of cases, the treatment of which is peculiarly unsatisfactory, by many regarded as almost hopeless, this point of view is not justifiable, unless one realizes that in certain of these cases diet unquestionably plays a role, and that a proper recognition of this fact should manifest itself in the appropriate dietetic therapy.

The abdominal form of migraine, Brams² states, is not mentioned in most books on gastro-enterology and very briefly in text books on nervous disorders. Some writers believe that abdominal pain may be simply another form in which migraine manifests itself; others have reported cases in which this epigastralgia was distinctly a temporary and vicarious substitute for the usual form of head migraine. Brams bases his report on a study of 22 cases seen in the polyclinic of Cohnheim, in Berlin, and concludes that:

1. Abdominal migraine occurs chiefly in those who suffer from typical head migraine or when there is a history of this disease in the family.
2. The disease manifests itself by periodic attacks of epigastralgia

¹ Journal of the American Medical Association, 1921, **77**, 1396.

² *Ibid.*, 1922, **78**, 26.

with nausea and vomiting of bile and mucus, and occasionally with diarrhea. Physical examination reveals no definite signs of any kind. The patient is free from all symptoms during the intervals between attacks. The attacks last a few days and begin and end rather abruptly.

3. The disease is refractive to all treatment, but is favorably influenced by antimigraine therapy. In view of the frequent presence of disturbances in the female pelvis, it is suggested that a course of ovarian extract be tried in these cases in addition to the regular arsenic and antimigraine measures.

Sodium Chloride for Headache. Increased intracranial pressure produces headache, and I have known a saline laxative to give temporary relief from headache in brain tumor, possibly by drawing fluid from the brain. Hughson recommends sodium chloride for this purpose, following the experience of Weed and McKibben and of Cushing and Foley in relieving intracranial pressure by the salt.

The ingestion of crystalline sodium chloride or of concentrated solutions of the salt in quantities sufficient to have the desired physiological effect was a problem which at first presented some difficulties. Persons suffering from severe headaches were found to have considerable trouble in retaining the salt for a length of time sufficient for it to pass into the intestine, where its absorption into the blood-stream could take place. The nausea following the ingestion was often considered more distressing than the headache itself. Hughson has employed compressed tablets, salol-coated, each containing 1 gm. of sodium chloride. Such tablets, he says, pass unchanged through the stomach, yet liberate the salt when the alkaline secretions of the small intestine are met. The clinical use of these tablets he acknowledges has been somewhat limited, but sufficient observations, he thinks, have been made to show that they have a beneficial effect in practically all of the milder forms of headache. Two or three tablets should be taken every five minutes with as small an amount of water as possible, up to a total of eight to ten. In severe headaches from twelve to fifteen, or even more, may be necessary. The administration of as much as 30 gm. (nearly 1 ounce) of sodium chloride is safe in a healthy adult and is, he says, far below the toxic limit. Contraindication to the use of salt is found only in certain cases of nephritis, hypertension and in persons past middle age whose salt tolerance is known to be low.

Hughson¹ is conservative. He says extended clinical observations must be carried out before a satisfactory opinion can be given regarding the value of this treatment. There is no reason for believing that all forms of headaches will yield to this method of therapy.

Quantitative Variations in Vibration Sensation. It is largely due to Wood² that more careful measures are taken in testing vibration sensation. Symms seems to have been the first to test the quantitative response to the tuning-fork, and Wood has carried on his work with a specially designed fork. He states that until quantitative variations are appreciated the value of the vibration test is lost at a time when its

¹ Journal of the American Medical Association, 1921, **77**, 1859.

² American Journal of the Medical Sciences, January, 1922, p. 19.

aid is most needed. Before total loss of vibration appreciation occurs there is a gradual dimming which with his instrument can be exactly recorded day by day and the progress of the process noted. For example, in tabes there occurs late in the disease frequently an entire loss of vibration appreciation in the lower half of the body; but, on the other hand, early in tabes before other signs of recognized value appear, it will be found that there is a definite quantitative diminution of the time during which these vibrations of standard amplitude are felt. The most notable variation was seen in tabes and the reduction in time was singularly constant in its occurrence over the sacrum.

Wood believes that loss of vibration appreciation is the first sensory loss in tabes, but it may be questioned whether such a case as he describes can be accepted as one of tabes. A man had strongly positive spinal fluid and a low vibration response. After a long period of observation areas of analgesia developed over the tibiæ. The inference is that this is a case of tabes, but no other findings were present. Wood believes that analgesia follows the alteration of vibration response in tabes. He states positively that any case with no reduction in the time of vibration response over the sacrum is not tabes, and the sacral loss seems to be an important means of distinction between tabes and other disorders with impairment of vibration sensation.

Wood states that a beginning only has been made in the quantitative testing of vibration as related to improvement in the spinal fluid.

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